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Printed in U. S. A.

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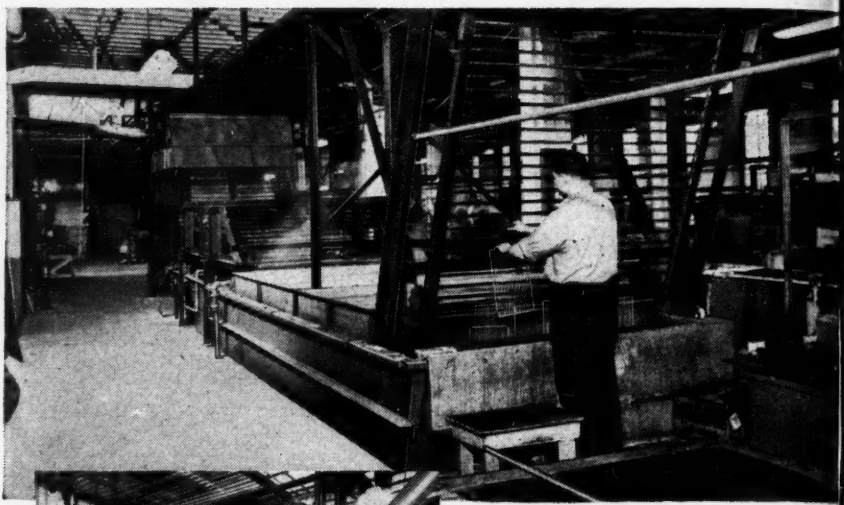
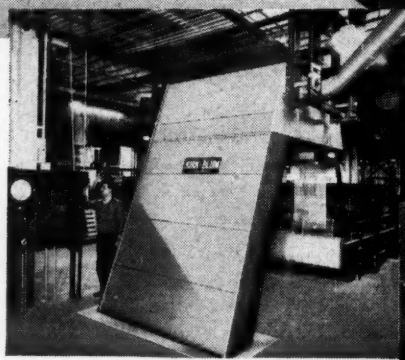
KIRK and BLUM

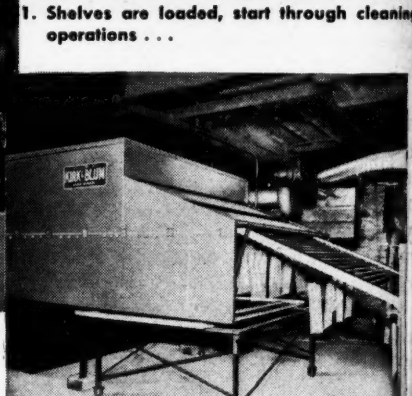
CLEANS....DRIES...



1. Shelves are loaded, start through cleaning operations . . .



2 . . . leave cleaning tanks, go down through drying tunnel . . .



3. To lacquer dip below, drain and then . . .

Pf editorial

JULY, 1949

Vol. 13, No. 10

Loyalty-An Intangible Asset

This month each and every American, in celebrating Independence Day, can use the occasion to pledge anew his loyalty to our Country.

Loyalty plays a big part in the industrial picture also, but the close personal relationships formerly existing between employer and employee have been lost, to a considerable degree, as organizations have grown and plants have expanded. During recent years an increasing amount of attention on the part of plant management is being given to the improvement of employee relations. This is a constructive, genuine attempt to establish or regain the confidence of the employee in his employer, and to develop a spirit of loyalty to the organization of which he is a part.

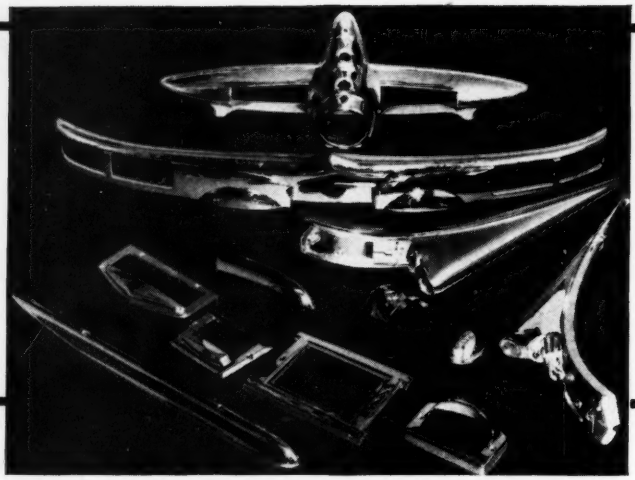
The exact approach to this problem or the way in which the desired result may be obtained has been the subject of considerable discussion. Personnel relations have become "big business." The application of selling techniques, advertising methods, principles of psychology and human relations, and so on, to the solution of the problem have all been thoroughly discussed and successfully employed.

These efforts have been initiated because of a realization on the part of management that employee loyalty is the only sound basis for employee cooperation; and that employee cooperation is a necessary and substantial part of operating efficiency. Management, in the effort to maintain or improve operating efficiency, has been guided less by selfish motives than by the sober realization that the preservation of our American system of free enterprise and our high standard of living depends on the production of more goods per producing unit.

Experiences of the past decade have emphasized the value of loyalty, and established the fact that employees cannot be expected to be loyal to an organization that does not have a sincere interest in them. Loyalty may be compared with a two-way street, on which traffic flows both ways.

Further, loyalty is not possessed of any osmotic pressure so that it can force its way up to the top of an organization; it must be initiated at the top so that it can spread to all parts of the group. And, to ensure the desired reciprocal response, the flow from the top must be continuous.

E. A. Blount



In its Lockland, Ohio plant the Electric Auto-Lite Company provides greatly expanded facilities, including a fully automatic plating machine, for the volume finishing of various shapes of automotive hardware and trim.

PF FEATURE

The Lamp Division of the Electric Auto-Lite Company, in equipping its new Lockland plant, has installed automatic polishing, buffing, and plating machinery to make possible the production of high quality plated die castings at a rapid rate. Housed in a section of the plant 360 feet wide and 1060 feet long, die casting, polishing, buffing, and plating operations are integrated by means of transport conveyors so as to form an efficient producing unit.

Die casting machines, located in one end of this section of the plant, produce the varied shapes which become automotive trim, a representative group of which are illustrated in the article heading. After casting, the parts are trimmed, machined, drilled, and tapped as required.

Polishing and Buffing

The first finishing operation performed on the castings is that of polishing the casting edges to remove the sharp edge flash from the parts. This operation is performed manually on Hammond polishing lathes equipped with backstands and 3-M-ite 150-grain abrasive belts, lubricated with a grease compound. Figure 1 is a view of this operation. After edge polishing, the die castings are buffed to a high luster on sewed buffs, as illustrated in Fig. 2. A tripoli buffing composition is used for this finishing process. Two long double rows of polishing and buffing lathes have been installed to finish the more intricate shapes which do not lend themselves readily to automatic polishing and buffing. Both straight-line and rotary automatic polishing and buffing machines are used for castings that can be handled auto-

Plating of Die Cast Automotive Trim

By EZRA A. BLOUNT

matically. Buffing of lamp doors, for example, is accomplished on the Acme 8-station automatic buffing machine, a view of which is shown in Fig. 3. The operator merely loads and unloads the lamp doors. Liquid buffing compound is sprayed on each buff. Figure 4 is a close-up view of two of the spray applicators used to deliver the liquid buffing compound, circulated continuously under 7 lb. pressure, to the buffs. To ensure shop cleanliness and dust-free air, dust from the various polishing and buffing machines is exhausted to American Air Filter "Rotoclone" air washers which wash the dust from the air, returning the cleaned air to the room.

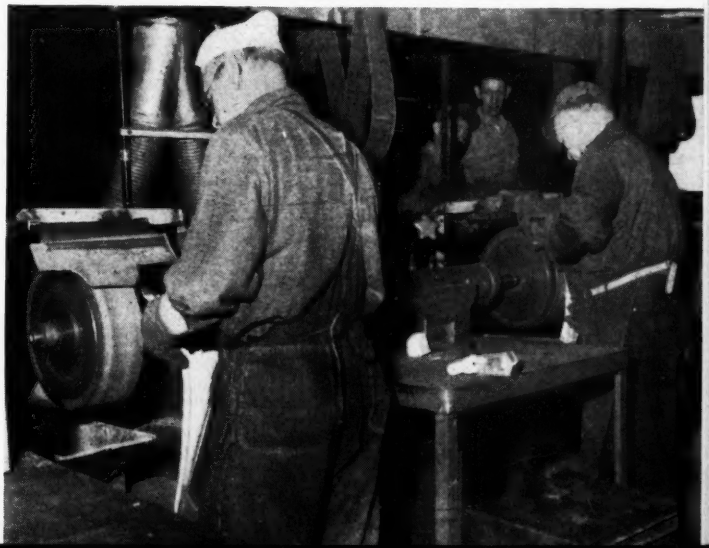


Fig. 1—Edge flash is removed from zinc-base die castings by polishing on 3-M-ite 150-grain emery, grease lubricated abrasive belts. Belts are supported for the polishing operation by hard buffs.

Racking

Buffed parts are racked for plating on specially designed plating racks, standardized as much as possible so that each rack is loaded with parts measuring between 5 and 6 square feet in plating area. The main bodies of the racks are formed from ¾ inch square copper bus bars and special racking hooks of various types hold the parts securely during the plating operation. The racks are insulated with either Unichrome 218 Special or Belke Universal plastisol rack coating material.

Cleaning

Suspended from an overhead mono-

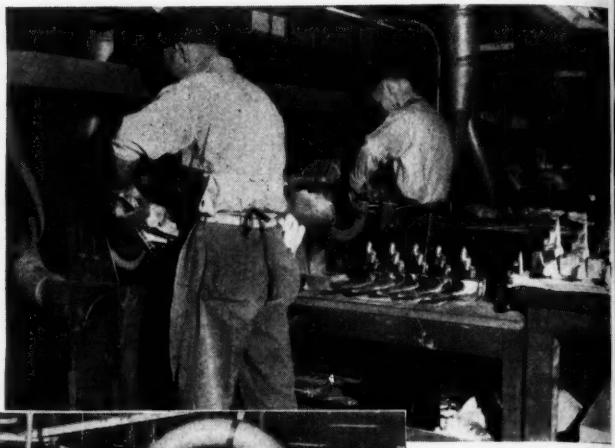


Fig. 2 (right) — One operator uses a narrow hard buff for final buffing of intricately shaped areas. The next operator buffs the more regular areas on a standard width buff.

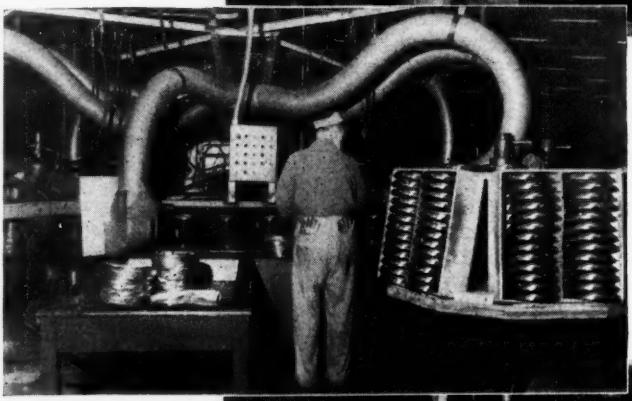


Fig. 3 (left)—Illustration shows operator loading and unloading 8-station automatic buffing machine, rigged for lamp doors. The control panel for the machine is located directly in front of the operator, while on his right is a rack for buffed lamp doors.

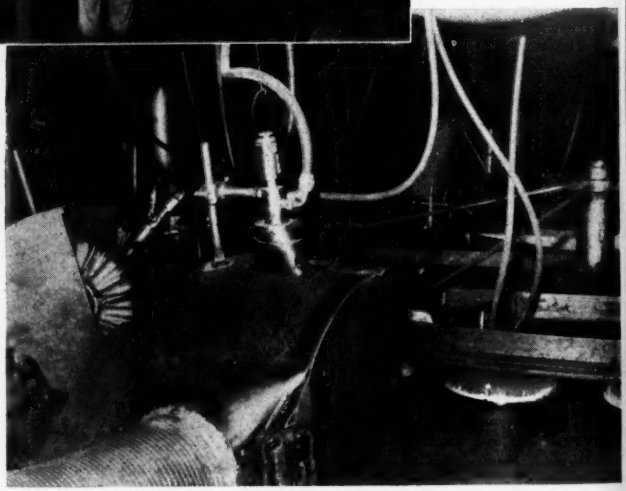


Fig. 4 (right) — A close-up view of the Rotomatic, showing two of the spray applicators used to apply compound to the buffing wheels

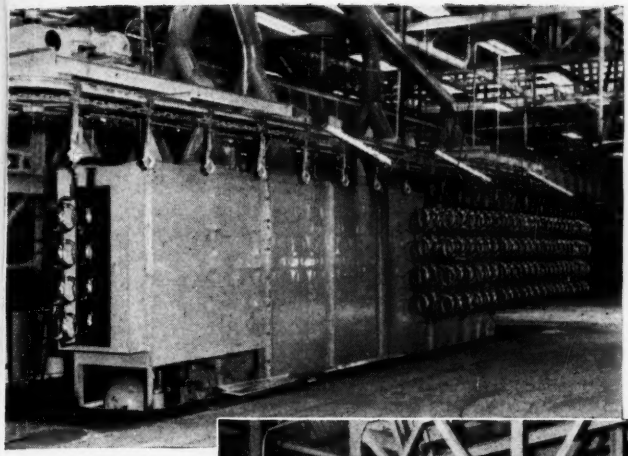


Fig. 5 (left)—A rack of washed lamp doors emerges from the 2-stage spray washer used to soften and remove the bulk of the buffing compound left on the parts from the buffing operation.

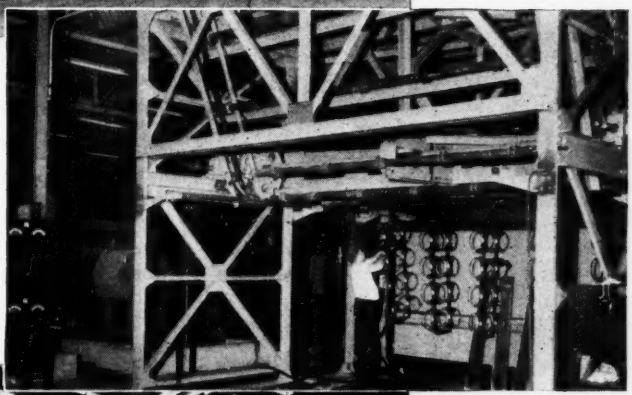


Fig. 6 (right) — The loader hangs five racks of lamp doors (or other parts) on each cross-rod of the Meaker automatic plating machine. At the extreme left can be seen some of the current controls, and in the background a filter press and generator.

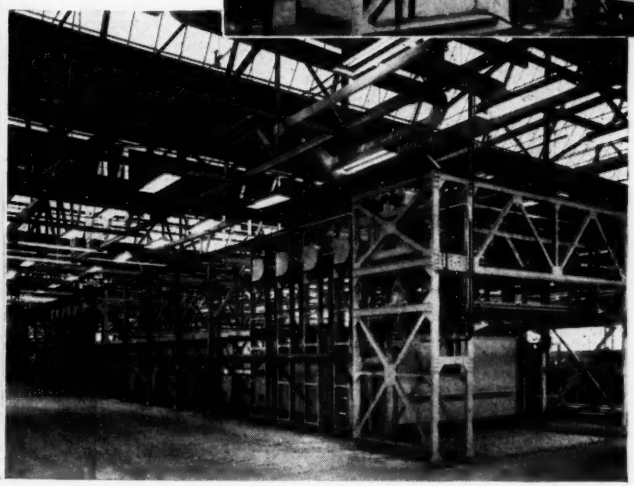


Fig. 7 (left) — Overall view of the Meaker automatic plating machine taken from the unloading end (*Photo courtesy The Meaker Co., Chicago 50, Ill.*)

Fig. 8 — Five racks of plated lamp doors emerge from the 14,850-gallon high speed copper plating solution which is operated at 180 deg. F. In the foreground can be noted the canvas diaphragms which separate the anode compartments from the cathode compartments of the solution, and prevent roughness of deposit.

rail conveyor, racked parts receive a preliminary cleaning in a Metalwash 2-stage spray washing and rinsing machine, as illustrated in Fig. 5. A cleaning solution composed of 3 oz./gal. of J. C. Miller 26P is sprayed on the parts at a spray pressure of 40 p.s.i. and a temperature of 170 deg. F., controlled automatically by a Sarco temperature regulator.

Nickel Plating

Pre-washed parts are removed from the run-around conveyor and hung on one of the cathode bars of a Meaker 5-lane, completely automatic plating machine, as shown in Fig. 6. The Meaker machine, an overall view of which is shown in Fig. 7, is 155 feet long and will process 184 racks of die cast parts per hour through the complete cycle. The solution tanks, made from ¼ inch steel plate, are 12 feet wide by 5 feet 6 inches deep, and vary in length according to the length of time required for each individual part of the process. The racks of parts move continually through the various solutions and are lifted by carry-over conveyors from one tank to another.

In the plating process accomplished by the Meaker automatic plating machine, die cast parts are cleaned in Northwest No. 30 electrocleaner, bright copper plated, and bright nickel

Fig. 9—A view showing parts being plated in the 21,350 - gallon bright nickel solution. Using a current density of 50 amp./sq.ft., parts are plated for ½ hour in this 140 deg. F. solution. In the background may be seen the tank used for electrolytic purification of the nickel solution.

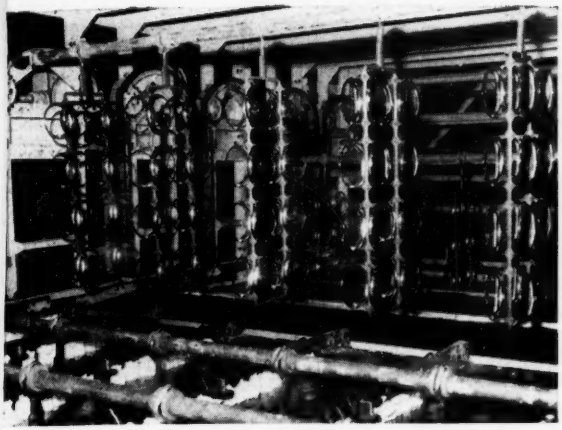


Fig. 10—Nickel plated lamp doors leave the bright nickel solution to proceed through three air-agitated cold water rinses and a final hot water rinse maintained at 130-140 deg. Fahrenheit.

plated, with appropriate intermediate rinses and acid dips. Figure 8 shows plating machine cross-rods, loaded with racks of die cast lamp doors, at the unloading end of the high speed bright copper tank, and one load of plated doors being carried over to a rinse following the copper plating operation. Figure 9 is a view of the 21,350-gallon bright nickel tank showing one of the two 12,500-ampere 9-volt generators serving this unit in the background. Figure 10 is a view of the exit end of the bright nickel tank showing racks of plated parts progressing through the four air-agitated final water rinses. With the aid of ion-exchange equipment, nickel solution dragout will be recovered from the first two rinse tanks and used for solution makeup and pH control purposes.

To ensure continuous satisfactory operation of this huge plating machine and guarantee the rapid rate of production and high quality of the plated products, every possible manual and automatic control has been engineered into the installation. Temperatures are controlled and recorded continu-

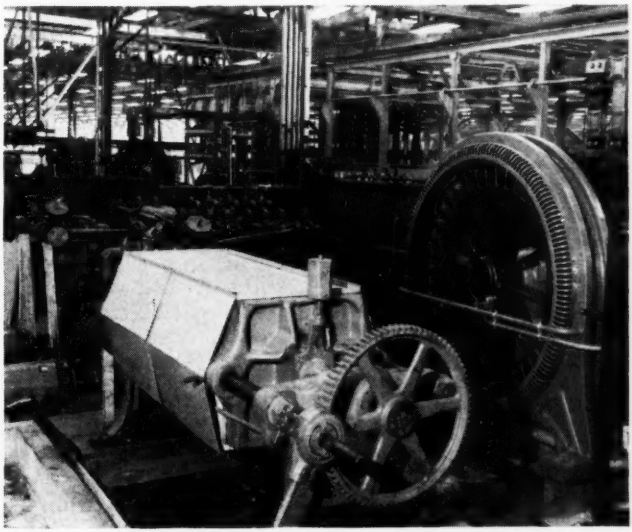


Fig. 11—A view showing part of the auxiliary equipment used in connection with the bright nickel solution. In the left background can be seen a solution makeup tank; left foreground, a filter press; left center background, a heat exchanger; right center background, the electrolytic purification tank; right foreground, one of the 12,500-ampere, 9-volt generators.

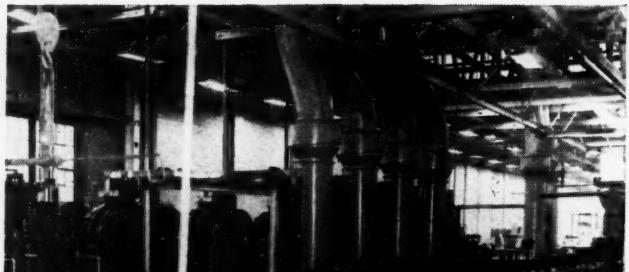


Fig. 12—A view of the chromium plating installation, showing the line of tanks (set in a pit below the floor level). In the background can be seen several exhaust stacks which form a part of the exhaust installation, as well as heat exchangers and generators.

ously. The rate of production is, of course, set and controlled at a constant value. Plating currents must be set manually, but the operator has all necessary controls and meters conveniently located so that he can easily maintain proper plating conditions.

Solution handling and treating equipment automatically pumps, heats, filters, and returns clean solution to the plating tank. Such equipment, a portion of which can be seen in Fig. 11, has been installed in duplicate so that no stop in production need occur while one of the plate-and-frame type filters is being cleaned.

The hard rubber lined tank containing the high speed copper plating solution is fitted with canvas duck porous diaphragms which separate the anode compartments from the cathode compartments. The solution in the anode compartment is filtered continuously through filter paper and activated carbon and then returned to the cathode compartment. The solution in the cathode compartment is filtered in a similar manner and is returned to the same compartment from which it was drawn. The minimum filtering rate for all solutions is once per hour. In addition, the copper solution is circulated three times per hour to ensure uniform chemical composition and high quality plating. The bright nickel solution, contained in a rubber lined tank with a course of acidproof bricks laid in the tank bottom is filtered once per hour. On the way to the filter the nickel solution passes through a four-lane purification tank where metal impurities are removed from the solution by plating with dummy cathodes at a current density of 5 amp./sq. ft. Facilities are available for filtering the copper strike solution once each 40 minutes, and the solutions in the electrocleaner and the washer once per hour. For this major solution treating installation, Duriron pumps, valves, and heat exchangers are used. Saran-lined pipe connects the various pieces of solution treating equipment to form a continuous system. Both Shriver and Sperry filters, of the plate-and-frame type, are employed. For removing carbonate from the high speed copper solution, a huge refrigerated tank is installed so that the solution may be pumped into the tank periodically, cooled to 26 deg. F. and, after the precipitated carbonate has been removed by centrifuging, returned to the plating tanks. Solution makeup tanks for each solution have been installed, as well as huge storage tanks for the high speed copper and

bright nickel plating solutions. Power for the installation is furnished by two 12,500-ampere, 9-volt generators, two 7,500-ampere, one 2,500-ampere, one 2,000-ampere, and one 1,500-ampere, 6-volt generators.

Chromium Plating

Die cast automotive parts are unracked after the completion of the nickel plating cycle and transferred to the chromium plating unit. There they are re-racked on insulated plating racks similar to those used for nickel plating and processed through the various solution tanks, each 9 feet by 51 inches by 6 feet deep, to emerge finished in gleaming chromium plate. A view of the chromium plating unit is shown in Fig. 12.

Several racks of nickel plated parts, the exact number depending on the shape and size of the racked parts, are suspended from copper bus bar carriers, and transported from tank to tank throughout the process by means of a Chicago tramrail equipped with a Yale ¼-ton hoist. Parts are first cleaned cathodically from ½ to 1 minute in an electrocleaner containing 8 oz./gal. of Northwest 38 cleaner, operated at 170 deg. F. with a current density of 50 amp./sq. ft. at 6 volts. Following this treatment, nickel plated parts which may have become passive are activated cathodically in a solution containing 4 oz./gal. soda ash and 4 oz./gal. sodium cyanide operated at room temperature with a current density of 50 amp./sq. ft. Two overflowing, air-agitated cold water rinses follow the activation treatment.

Next, parts are dipped in cold, 5 per cent sulfuric acid, contained in a rubber lined tank fitted with a course of acidproof bricks in the tank bottom. Two air-agitated cold water rinses follow the acid dip. The rinse tanks are rubber lined and have acidproof bricks in the tank bottoms also.

Parts may now be chromium plated in any one of four chromium plating tanks. Each tank is lined with acidproof brick (Knightware) and holds 1,450 gallons of a solution composed of 50 oz./gal. chromic acid and 0.5 oz./gal. sulfate operated at 110 deg. F. J. C. Miller antimony-lead anodes are used. Each tank is served by a 7,500-ampere 9-volt generator, two of which may be seen in Fig. 13. Racks are placed in a chromium plating tank with the current on so that plating may begin im-

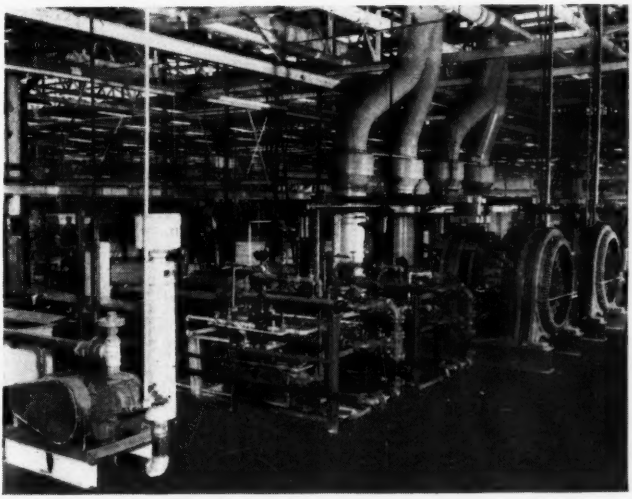


Fig. 13 — Illustration shows two of the heat exchangers used for heating chromium solutions. At the left can be seen one of the compressors which furnishes air for solution agitation and at the right are two of the four 7,500-ampere, 9-volt generators which furnish power for chromium plating.

mediately. For some intricately shaped parts a strike is necessary, after which the current is lowered to the normal value and plating continued 4 to 5 minutes.

After chromium plating, parts are rinsed in a dragout recovery tank, also brick lined, and then in an air-agitated water rinse tank. Next follows a neutralizing dip in a solution containing 3 oz./gal. soda ash. Parts are next rinsed in an air-agitated water rinse followed by a hot water rinse. Completed parts are unracked and routed to the shipping department or the assembly department.

Each of the four chromium plating solutions is heated by means of a Duriron heat exchanger equipped with a Brown automatic temperature recorder-controller. Further, each chrome tank, as well as the electrocleaner, activator, and final hot water rinse, is fitted with an exhaust system connected to a 15,000 c.f.m. exhaust fan. Each exhaust stack contains a moisture extractor to reclaim moisture and/or droplets of chromic acid. In addition, a 10 x 12 x 17-foot baffle chamber is incorporated into the system to reduce the velocity of exhaust air and extract any moisture which may have by-passed the stack extractors. In addition to the four generators previously mentioned, a 4,000-ampere, 12-volt generator is used for the cleaning and activating solution tanks. Economy and shop cleanliness are both served by steel drip pans, connecting each pair of adjoining tanks and sloped toward the tank from which the parts in process are being removed.

A plating installation of this size and complexity requires extensive facilities for chemical control of the quality of the product as well as the composition of the many processing solutions and even the chemical control of the waste water. Figure 14 is a

Fig. 14—Illustration shows some of the equipment used for control of solution composition and product quality in Auto-Lite Lockland plant chemical laboratory.

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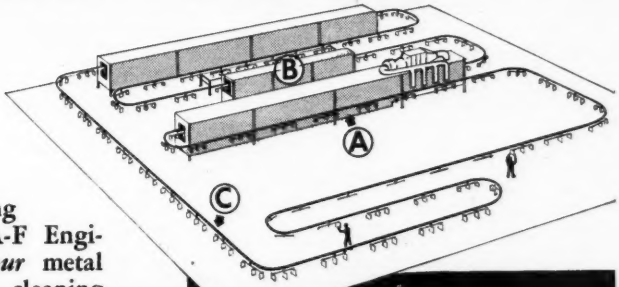

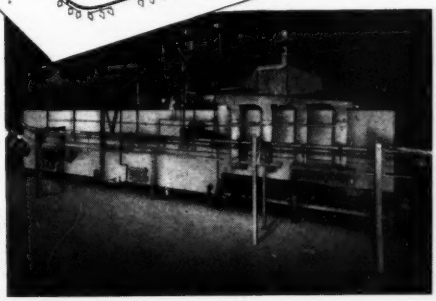

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view of one corner of the well-equipped chemical laboratory installed in the Auto-Lite Lockland plant. Here all solutions are analyzed regularly and various tests of coating quality are made.

Good practice and sound engineering, combined with adequate solution handling facilities are exemplified by the plating installation described here. Those who have been plating die castings for 20 years can certainly appreciate the advancements in all branches of the plating industry which have made possible the designing, installing, and operating of an efficient high-production, die cast plating plant such as that of the Lamp Division of the Electric Auto-Lite Company.

Robert C. Stanley, chairman of the board of directors of The International Nickel Company of Canada, Limited, in presenting his annual report to the shareholders pointed out that International Nickel of Canada had supplied consumers in the United States with 177,000,000 pounds of nickel during 1948. Mr. Stanley further stated that his company produced more nickel, platinum, and palladium annually than any other company and is ranked fifth among the world's copper producers. Other metals extracted in limited quantities from nickel ore by International Nickel of Canada are gold, silver, ruthenium, iridium, rhodium, selenium, tellurium, and cobalt.

Mr. Stanley also stated that sales of nickel for the purpose of nickel plating had increased to a point approximately two and a half tmes that reached during the pre-war period. Improved plating operations and more resistant coatings have encouraged wider use of nickel plating on modern products of all kinds. Such articles as automobile bumpers still account for the largest consumption of nickel for plating purposes.

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Proving Ground for Quality

Program of minimum standards pioneered by Steel Kitchen Cabinet Institute stimulates consumer confidence, broadens acceptance of product, builds goodwill for this industry. Cabinet finishes must pass grueling tests before a manufacturer wins approval seal.

By ARTHUR P. SCHULZE

NEVER was there a time when the need for manufacturers to preach and practice the gospel of quality has been so downright urgent as it is right now.

This is true because in these days of spiraling costs for manpower and materials—pushing break-even points higher and higher—and competitive markets, the temptation to lower quality standards to pare production costs is an appealing one to some short-sighted producers of consumer goods.

Of course, the story of quality and and its long-range importance to merchandising success is frequently viewed as a trite tale. While it is recognized that current conditions make it imperative to economize wherever practicable, consumer acceptance and public goodwill, however, preclude the practicability of securing such savings at the sacrifice or expense of product quality and all this time-honored phrase implies.

Cheapen quality, in finishing operations especially, at a time when competition for capturing a greater share of the consumer dollar is becoming increasingly intense, and you have taken the first step toward switching balance sheet figures from black to red.

By and large, consumers at present are focusing their attention on the quality factor in purchasing as never before, a condition which is easily understandable. Among other reasons, it is due to the fact that during the war buyers received a steady diet of "ersatz" materials in many of the items then available. Consequently, today's purchasers are completely "fed-up" with substitute merchandise and sub-standard goods.

Little wonder, then, that the cost-conscious consumer likewise is more quality-minded than ever. When it comes to laying his hard-earned money on the line for merchandise, particularly consumer durables, the

buyer is now interested chiefly in two things: (1) genuine, honest-to-goodness, dependable quality; and (2) positive assurance, whenever available, that he is getting 100 cents worth of value for every dollar spent.

It is recognized that many manufacturers, both large and small, have made significant strides across recent years in painstakingly developing and rigidly maintaining quality standards for their products. Still there remain other producers who have neglected their responsibility of spurring and safeguarding consumer interest in their wares by failing to watch and maintain quality with the same ever-vigilant eye and rigorous care. Fortunately, their number is exceedingly small.

Of the elements going into a product likely to suffer most whenever a let-down in quality control maintenance occurs, intentionally or otherwise, protective and decorative coatings more often than not come close to the top of the list. This is especially true of steel kitchen cabinets and their protective coatings.

As the "workshop of the home," the kitchen is subject to more wear-and-tear than any other room. Cabinets must be sturdy and strong to hold shelf after shelf stacked high with dishes, canned goods, and heavy utensils. Moreover, kitchen cabinets occasionally must take punishment for which they never were intended—for instance, when Junior uses the drawers as a step ladder to reach the jar of his favorite jam for his after-school snack.

One remarkably successful answer to the present-day's pressing problem of keeping product quality high despite climbing costs may be found in the quality standards program pioneered for its industry by the Steel Kitchen Cabinet Institute of Cleveland, Ohio.

From this plan, based on this organization's 11 years of accumulated

ARTHUR P. SCHULZE, member of the Cleveland, Ohio staff of Hill & Knowlton, public relations counsel, and industrial writer, is no stranger to readers of PRODUCTS FINISHING. During 1948 alone he contributed articles on "Abrasion Testing of Anodized Coatings," "Die Castings Must Be Clean," and "Flock Coating Practices."

A native Clevelander, Mr. Schulze attended the University of Missouri, graduating from the School of Journalism in 1936.

His acquaintance with the finishing industry was made in 1938 when he became associated with Oakite Products, Inc., New York, N. Y., as a writer in the advertising department.

After his military service with the Quartermaster Corps, U. S. Army, he joined Taber Instrument Corp., North Tonawanda, N. Y., as publicity manager. He became a staff member of Hill & Knowlton in 1947.

Mr. Schulze's work in advertising and public relations has brought him into close contact with the problems of the finishing industry and provides a solid background upon which to base his industrial writing. He has contributed articles to leading magazines in the finishing field as well as the machine tool and business fields.

Arthur P. Schulze

Fig. 1—The draw test whereby the finish must withstand a 0.300" draw without showing signs of breaking down, is one of 11 scientific tests established by the Steel Kitchen Cabinet Institute duplicating physical and chemical conditions encountered in normal everyday use of steel kitchen cabinets. Specimen is clamped between two plates for testing as shown.

practical experience in working with a wide range of quality control problems, has evolved a set of standardized quality controls over production which protect the prospective purchaser of steel kitchen cabinets by providing him with the sound assurance of getting equipment of durable construction and lasting finish at a reasonable cost.

This basic fact makes the Institute's heretofore little-publicized efforts in this direction of timely interest and value to all product finishers. These efforts may well serve as a guide in assisting others who are now seeking more practical means to establish and maintain minimum basic standards of quality in finishing their products with organic coatings.

The program was first organized back in 1938 when production of steel kitchen cabinets was still largely an infant enterprise and was restricted to a mere handful of companies. The Institute has since kept pace in growth with the development of this segment of the metal-working industry until today the membership of the organization comprises a number of the leading manufacturers and national distributors of steel kitchen cabinets.

As a result, following more than two years' continuous intensive experimenting and testing, the Steel Kitchen Cabinet Institute finally formulated and embarked upon a quality-testing program covering steel cabinets and cabinet finishes. It is a plan designed to guard the public against sub-standards—underweight steel, defective or weak construction, inferior hardware, and inadequate finishes.

Continuously improved upon since first announced in 1940, these exacting tests have enabled the Institute to set up definite controllable minimum standards of quality to which its members voluntarily subscribe and maintain, and which specifiers and consumers have increasingly recognized and appreciated. In recognition of his efforts to keep quality high, the Institute awards the use of a special seal of approval (copyrighted) to each manufacturer whose line of cabinets meets all the required tests.

Production-line samples, selected at random by the Institute, undergo an exhaustive series of grueling tests, some 21 in all. Comprehensive in scope and performed on an impartial basis, these scientific tests are conducted in the laboratories of the Robert W. Hunt Company, engineers, Chicago. These tests are open to both members

and non-members of the Institute on exactly the same basis.

Appearance of the Institute's "Quality-Tested" seal on any manufacturer's cabinet line thus certifies that his line has successfully passed all stipulated tests and that it has been made in conformance with definite minimum standards of quality. These encompass not only certain gauge, construction, rigidity and performance requirements, but prescribed finish requirements and tests as well.

In this connection, however, it also should be mentioned that these standards are **minimum** standards only. As S. S. Keeney, executive secretary of the Institute, points out: "These minimum standards of quality place no limitation whatever upon any producer's ingenuity of design or refinement of construction and finish which will contribute to making still higher product quality possible."

It is equally interesting to note that after the manufacturer has satisfactorily completed all tests and has been granted the right to use the Institute's quality insignia, he must maintain the quality standards adopted and approved by the Institute and also report any major change in design, hardware, or finish.

Furthermore, as a quality check, the Institute may, at any time, select a cabinet for tests from the production line, or purchase one of the maker's cabinets in the open market. If the cabinet fails to meet any of the established tests, the manufacturer must surrender his right to use the Institute's seal of approval until such time as later laboratory tests have been satisfactorily made.

Cabinet body, welding, doors and drawers, exposed surfaces—all are subjected to rigid tests designed to give consumers positive assurance in advance of purchasing cabinets that they will provide dependable performance for years to come.

Wall cabinets are tested for strain and load deflection. Doors get a three-point test to determine their resistance to distortion. Opened and closed 50 times a minute, a door must go through 50,000 such cycles without failure of door catches, as well as through a minimum of 125,000 cycles without hinge failure. These examples typify the range and thoroughness of quality-testing.

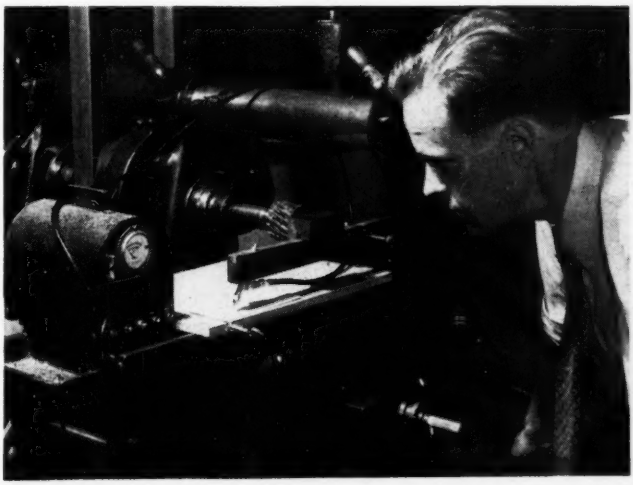


Fig. 2—The ideal metal cabinet finish must be neither too hard nor too soft. If too hard, it tends to chip or peel, and if too soft, it tends to scratch. Here, a paint coating is being tested for its scratch hardness quality. An acceptable finish must resist scratching by a steel needle set at 45 deg. angle to the surface under minimum pressure of 250 grams.

Recognizing that rust is the enemy of mild steel, 11 different tests are employed for evaluating quality "mileage" of applied finishes. Tests forming the basis of minimum quality standards for metal cabinet finishes

Fig. 3—Another important test for steel kitchen cabinet finishes is the impact test. The finish does not flake or peel upon exposure of the face of the coated test panel to an impact of 20 inch-pounds given with rounded steel instrument ½" in diameter as illustrated above.

advocated by the Steel Kitchen Cabinet Institute for its industry are summarized below. To merit the approved-quality rating, the manufacturer must finish his line of cabinets with a protective-decorative coating which will satisfactorily withstand these tests.

The standarization committee of the Institute, with its technical sub-committee, has been very careful from the first not to attempt to write a specification for any particular method of cleaning the steel prior to finishing, nor to specify how the paint is to be applied, the number of coats or the thickness of the paint film. Neither do they state that an acceptable finish must be achieved through use of any particular paint formula. Rather, the whole matter of acceptability is left to the tests, conducted in an independent testing laboratory. Thus, the way is left open for constant improvements.

Most industrial finishers are aware of the pronounced progress accomplished in recent years in the development of synthetic industrial finishes. Colorfast, tough and durable, these finishes, baked on the steel at a high temperature, give the surface a moisture-proof finish which endures for years if not abused by the user.

No particular formula for enamel is specified by the Institute due to the fact that research and development constitute a continuous activity of all progressive finishing materials suppliers. Therefore, new and improved materials are being made available to cabinet manufacturers all the time. Use of any good enamel is satisfactory so long as it provides a protective and decorative finish that successfully survives the following tests for color retention, adherence, resistance to chipping and peeling, and other essential properties characteristic of a good finish.

Finish Tests

1. Water Immersion Test—The finish covering one-half of a standard-size test panel must withstand submersion in water maintained at 100 deg. F. for 24 hours without showing more than slight blistering, which should disappear following a 24-hour recovery period. Test panels are compared with photographs (supplied by the Institute) showing the limits of permissible blistering.

2. Impact Test—There is no flaking or peeling of finish when the face of the panel is exposed to an impact of 20 inch-pounds delivered with a rounded steel instrument, which is a 2-pound steel bar, ½ inch in diameter

with a contact end semi-circular in shape, that falls a minimum distance of 10 inches.

The test panel is supported on a heavy steel block containing a hole ⅝ inch in diameter, the top of which has been lightly filed to remove the sharp edge. The hole is centered under the rounded-end impact cylinder. Temperature of panel when conducting test should be room temperature, but not less than 65 deg. F. in any case. Panels are aged for a minimum period of 15 days prior to testing.

3. Humidity Test—Finish does not blister after subjection to a humidity of 100 per cent at 100 deg. F. for at least 48 hours. Test panels are compared with SKCI pictures illustrating the permissable limits of blistering.

4. Salt Spray Test—The finish must withstand a 20 per cent salt spray solution maintained at 95 deg. F. for a period of 100 hours without developing "pinholes."

In this test, panels coated with material under investigation are suspended in an enclosed box, at the base of which a nozzle is introduced that atomizes a 20 per cent salt solution. Temperature is controlled at 95 deg. plus or minus two degrees. Panels are checked at periodic intervals throughout the test and time in hours required to produce a "pinpointing" effect in the finish is recorded. Before testing care must be taken in handling panels to make certain they are not beveled or scratched.

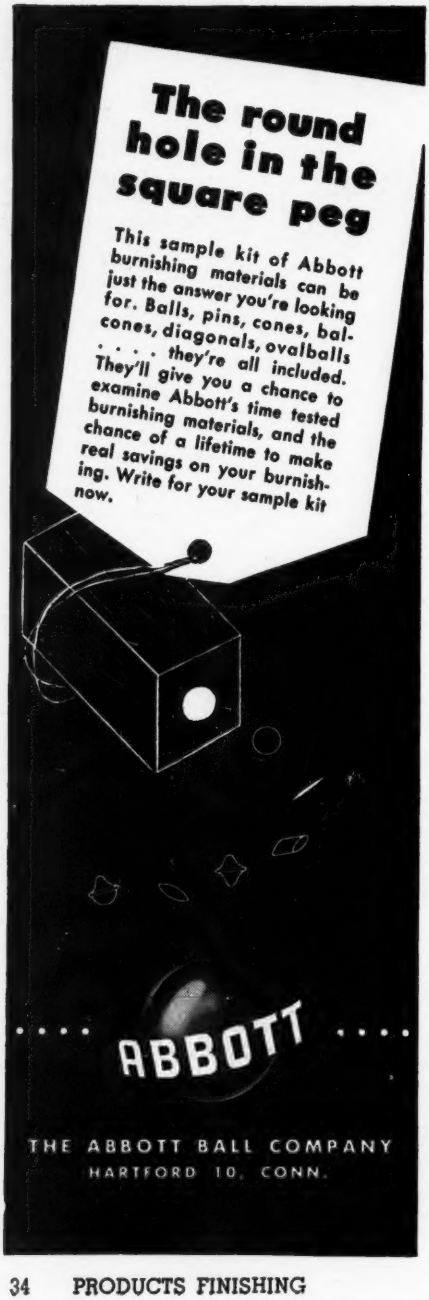
5. Draw Test—The coating withstands a draw of 0.300 inch in depth without showing any signs of breaking down.

The test specimen is clamped between two plates. The lower plate has an opening 2¼ inches in diameter with relieved edges, while the upper plate has an opening 2 inches in diameter. Panel is located by a 2 inch diameter ball. Deflection at the point where the coated surface breaks is noted.

6. Abrasion-Resistance Test—The finish must withstand the eroding effects of 4 kilograms of Ottawa sand dropped at a 45 deg. angle from vertical through a tube one meter long. Top inlet opening of the tube is 7 millimeters, the balance of the tube 11 millimeters in diameter.

The test is continued until the protective coating has been worn through by the abrading action of the sand, exposing the bare metal surface. Amount of sand required to produce abrasion is then measured.

Fig. 4—Seven panels pictured here are being tested for their resistance to hot fats. This test and 10 others for cabinet finishes that help make up the quality standards program of the Steel Kitchen Cabinet Institute are performed in an independent testing laboratory.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7. Alcohol Test—The finish shows no loss in luster nor noticeable etching when drops of 190-proof straight alcohol are placed on panel and allowed to evaporate spontaneously at room temperature.

8. Hot Fat Test—The finish does not discolor nor permanently soften upon immersion of coated panel for 2 minutes in either vegetable or animal fat heated to a temperature of 200 deg. F.

9. Scratch Hardness Test—Under a needle set at an angle of 45 deg. to the specimen, the finish must withstand a minimum load of 250 grams before a scratch through the coating results.

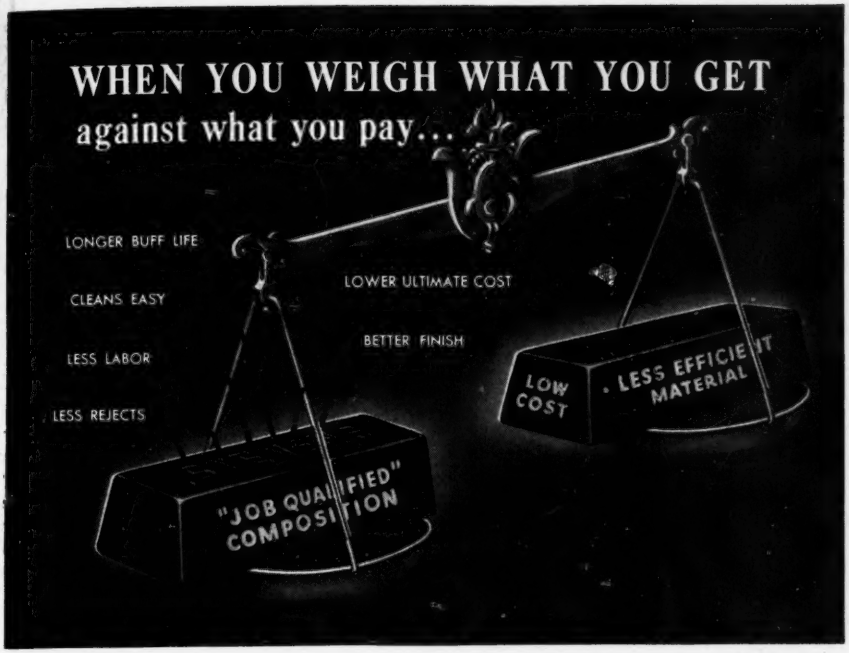
The needle used for scratch hardness testing is designated by the manufacturer, Decca Record, Inc., as "high grade tool steel loud tone." With lever type adjustable load apparatus, the specimen is drawn slowly and smoothly under this particular type needle at 45 deg. and the gram-load required to scratch through the finish is determined.

10. Weatherometer Test—Panels do not become excessively discolored through exposure in a Weatherometer Machine for a number of hours equivalent to 20 days of intense Florida sunshine.

Before making this test, one half of each panel is shielded tightly with heavy foil (aluminum or tin) to block out all light from that portion of the specimen. Panels are then exposed in the Weatherometer unit for 10 regular cycles—a period of 240 hours—which manufacturers of the apparatus have estimated as simulating exposure conditions tantamount to 20 days of Florida sunshine.

11. Alkali Test—The finish must show no bubbling, blistering, gloss reduction, or any undue softening of the coating after submersion in a 1.5 per cent solution of a designated alkali-containing material maintained at a temperature of 180 deg. F. for 60 minutes.

Panels are immersed in this solu-



the balance is in favor of Stevens "Job-Qualified" Composition

The cost of buffing and polishing materials is an important factor in metal finishing and it would be wise to remember that very often the use of low-priced material may prove to be expensive in the long run. Savings involved in buying a barrel of "cheaper" composition may very quickly be wiped out by losses due to increased buff wear, rejects, extra cleaning costs, lost man hours—to say nothing of unbalanced output schedules.

On the other hand it would be equally foolhardy to buy only the highest priced materials without first checking composition performance on the job.

Since it is impossible to production-test every product offered, you are faced by the problem of selecting a buffing or polishing composition that is "Right" for *your* work. At this point, we suggest that you call in a Stevens sales and service representative. He is particularly well qualified to recommend from Stevens' broad range of job-tested, service-proven compositions the one or more specific grades formulated to answer your specific needs. Better finish, easier cleaning, longer buff life, less rejects and increased production are characteristic money-saving advantages of Stevens "job-qualified" compositions.

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tion (2 oz./gal. distilled water), after which they are removed, rinsed thoroughly in running tap water, allowed to dry at room temperature, and carefully examined.

As far as steel kitchen cabinets are concerned, it may be concluded from the foregoing discussion that top quality is still being maintained by a number of r e p u t a b l e manufacturers. In fact, it may be safely said that quality standards in this industry are superior today to those prevailing in prewar days.

As one representative indication of this never-ending quest of better quality, the operation of surface treatment for painting may be specifically cited. Where phosphate-coating of steel prior to finishing was followed by only one kitchen cabinet producer before the war, this technique now constitutes universal production practice among all leading manufacturers in this industry. The reason is that, having discovered its value in connection with war work, these concerns we quick to apply the process to the peacetime production.

In short, quality *tells* and quali *sells*! There is no substitute for it— matter what the product—and th frequently spells rigid strength, lo life, and wearability implemented lasting beauty of finish, especial where consumer goods are concerne

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35th Annual Proceedings of the Ame ican Electroplaters' Society. Publishe by the American Electroplaters' Societ Box 168, Jenkintown, Pa. 312 pages. I lustrated. Cloth binding, board cover Price, $5.00.

This volume presents a record of th technical sessions of the 35th Annual Co vention of the American Electroplater Society held in Atlantic City from Jun 28 through July 1, 1948. It provides record of the Convention proceedings, a well as a complete presentation wit photographs of each technical paper an the discussion following the presentatio The various committees of the America Electroplaters' Society are listed, as we as the A.E.S. Branches.

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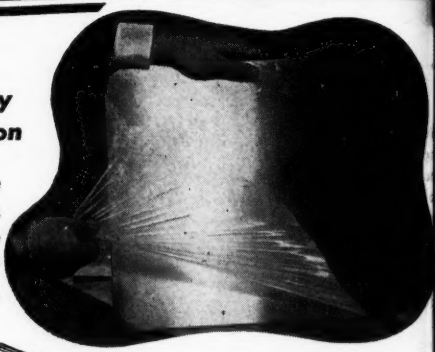

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Finishing Clinic

In this department are presented some of the questions submitt by readers together with suggested solutions of the proble outlined.

Question. *I have been following your articles on barrel finishing with great interest, particularly your reference to sodium tetraphosphate, used as an abrasive support and rust inhibitor. Can you furnish any information regarding this material, including cost, application, and so on?* *L. C. B.*

Answer. The sodium tetraphosphate discussed recently is a form of polyphosphate glass produced by the Rumford Chemical Co., Rumford, R. I., and marketed under the trade name "Quadrofos." It is available both in granular form and in small transparent beads. It is very hydroscopic and when used in a 50-50 solution, only enough to wet the surface of the weight carrying medium used in barrel finishing is required. This wetting of the surface provides a tenacious and adherent coating which aids in holding abrasives in suspension during the barrel finishing process. The phosphate material rinses readily and acts not only as an inhibitor but a solvent for oxide films or insolu soap films. H. L. F

— fc —

Question. *Can you help us obtain formation relative to the best poss way to remove synthetic enamel f conveyor hooks and hangers? We w also appreciate information on s used for hangers, possibility of salv ing paint removed from hooks hangers, how often paint should stripped from hangers and the po bility of coating hooks prior to us* *M. M.*

Answer. Concerning the remova synthetic enamel from conve equipment we should like to refer to a number of manufacturers of p removers, any one of whom wil glad to work with you in the solu of your problem (names of six c panies furnished).

The steel used for the hangers

of any type consistent with the temperature and the mechanical strength requirements. Ordinarily, cold rolled steel is adequate. In the larger plants there are facilities for salvaging overspray paint but we are not familiar with any of these installations which salvage paint removed from hooks and hangers. Paint is usually stripped from hooks and hangers once per week or oftener, depending upon the local situation.

Although it is usually not necessary to coat hooks or hangers with a material such as that used on the paint spray booth walls, it is quite possible that in your operation such a material might be advantageous. Therefore, we are pleased to refer you to the following manufacturers of coating materials (names of six companies furnished).

— fc —

Question. *We have two problems concerning silver plating in our manufacturing operations on which we would appreciate your advice. The first is in connection with silver plating over lead joints on our musical instruments, such as cornets, trumpets, and trombones. These horns are assembled by soft soldering the conections, which leaves a small streak of lead on the joints. These areas tend to become exposed as a result of scratch brushing and buffing performed after the silver plating operation. Can you suggest a method by which we may obtain a heavier deposit of silver on the lead joints?*

Our other problem relates to the finishing operation on horns after they have been silver plated. Do you know a solution other than electropolishing in which a silver plated object may be immersed to brighten the surface appearance so that scratch brushing and final buffing operations may be eliminated entirely? C.W.

Answer. It is possible that by using a preliminary copper strike you can secure a more even silver deposit all over the part in question. Therefore, I should like to suggest the following process to be used for the silver plating operation:

1. Clean the parts as you are now doing.
2. Water rinse.
3. Dip in weak sulfuric or muriatic acid.
4. Water rinse.
5. Copper strike for 20 to 30 seconds in the following solution:
   copper cyanide____3½ oz./gal.
   free sodium cyanide ¾ oz./gal.
   Rochelle salts_____ 6-8 oz./gal.
   temperature____140-180 deg. F.
6. Water rinse.
7. Silver plate.

If you have a nickel solution, and especially a bright nickel solution, available you can substitute a nickel strike for the copper strike mentioned in Item 5.

We cannot advise you concerning any solution in which a silver plated object may be immersed for the purpose of smoothing down or brightening the deposit. However, we can refer you to an organization which has developed a new brightener for silver solutions through the use of which it is possible to obtain mirror-bright silver directly from the plating bath. A news release concerning this process appeared on Page 124 in the May issue of PRODUCTS FINISHING.

Do you have a finishing problem?

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Electrolytic Pickling for Galvanizing and Terne Lines

By E. A. MATTESON

Sales Engineer
The Aetna-Standard Engineering Company

THE problem of pickling cold reduced sheets or strip for hot dip coatings has long been a serious one. The tin plate makers found that it was necessary to clean, either by electrolytic or plain alkali means before annealing, to remove rolling oils which cause a carbon smudge on the surface of the steel when annealed. This smudge complicated and slowed down the pickling action and left a dirty deposit which was almost impossible to remove.

The volume of tin plate material involved made it economically feasible to install continuous cleaning lines. The wider material and heavier gases as well as lower tonnage and greater varieties for galvanized and long terne products do not warrant such an investment in equipment in many plants.

The galvanizer had to resort to many other methods in order to produce a material that would coat effectively. With "deox" or other special methods of annealing, longer pickling cycles, T.S.P. dips, and other operations, the hot dip producer has suffered through this job. The longer pickle cycle not only was more costly, but hydrogen embrittlement became a still more serious problem. Almost every shop has found a somewhat different solution to the problem, and what works in one place often does not work in another due to different rolling and annealing practices.

Electrolytic pickling for hot dip tinning came into common use ahead of that for other hot dip coatings. The method used is to eliminate white pickling and it is not suitable for galvanized or long terne products. The tin plate strip is cleaned ahead of annealing and, therefore, requires only a light pickle in a weak muriatic acid solution at room temperature. An anodic pickle action is secured through the use of 350 amperes at 6 volts.

An early, if not the first, use of electrolytic pickling for terne plate and galvanizing was at Gary, by the Carnegie-Illinois Steel Corporation, on an experimental coating line. From the results obtained on this unit, it was determined that a production unit

An address presented at 22nd Meeting of The Galvanizers Committee, St. Louis, Missouri, April 12, 1949.

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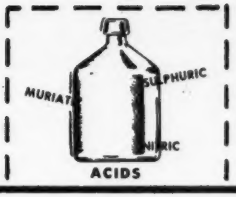

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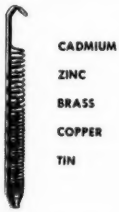

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should be included in the continuous strip terne line which was built and installed at Gary in 1948. This unit has now been in operation sufficiently long that we can highly recommend this method for the preparation of cold reduced steel for coating.

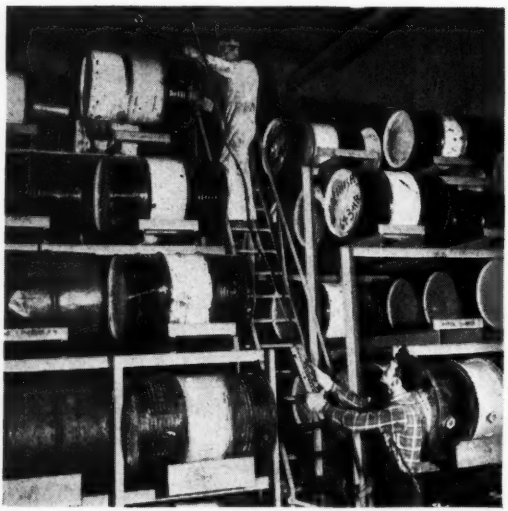
A sketch showing a section through this pickler reveals the fact that alternate anodes and cathodes are placed above and below the strip. Glass guides prevent the strip from contacting the electrodes. A 20 per cent sulfuric acid solution is used at a temperature ranging between 160 to 180 deg. F. A current density of 5000 amperes at 8 to 10 volts is used for normal operation. No inhibitor is used since the immersion time is very short. A hot water scrubber with revolving brushes follows the pickler. The strip comes to the unit as a cold reduced, box annealed, temper rolled product. Either a box deoxidized or box gas type material is suitable for pickling in this unit. In this plant the strip is not cleaned after cold reduction and the most favorable results have been obtained with the box gas anneal. Th slight oxide resulting from this typ of anneal seems to provide somethin for the pickler to work on, and a clean er material is obtained after pickling

So far, acid consumption has bee averaging 60 lb. per ton in compariso with 75 lb. for batch pickling. Ther are indications that this consumptio can be still further reduced.

By this method there is no hydroge embrittlement and thus a substantia reduction in pinholing is obtained. I addition to better coating, the absenc of hydrogen results in improved ductil ity of the steel and deep drawing re quirements are more easily met.

A second installation was made a the Irvin Works of Carnegie-Illinois within the last few months. This pickler is designed to handle sheet lengths and is located directly ahead of a sheet galvanizing machine.

This unit works on the same principle as the one installed in the terne line. A current density of 5000 amp. at 15 volts is available. Normal operation requires 3500 to 4000 amperes. A sul-



STORING a drum of thinner on the top rack in the paint storage room of the Westinghouse Electric Appliance Division plant in Mansfield, Ohio, is done easily and safely with a floor-operated bridge crane and a movable ladder, as shown in the accompanying illustration.

Other safety features of this paint storage room include the use of vapor-proof electrical fittings and fixtures; spark-proof floors and tools; exhaust fans which maintain vapors below explosive mixtures at all times; spring-closing brass valves on drums where it is necessary to make withdrawals; and drip pans under valves to prevent spread of thinner and fast evaporation.

(Photo courtesy Westinghouse Electric Corp., Pittsburgh, Pa.)

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furic acid solution of 12 to 15 per cent is normally used, although good results have been obtained with a solution as low as 7 per cent. Acid consumption in this pickler appears lower than in the terne line unit; however, it has not operated long enough for accurate figures to be prepared.

Up to the present time the sheets have been cleaned before annealing and a bright anneal is used. Wider and heavier material is to be coated on this equipment in the future, and at that time the cold reduced material will be box annealed without a cleaning operation. Substantial savings over batch pickling can be anticipated.

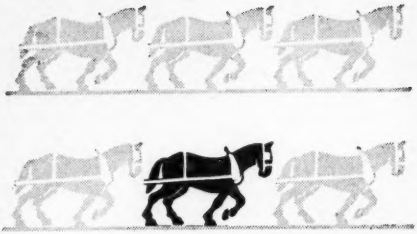
Following the pickler the sheets pass through a water rinse and a muriatic acid dip. No great improvement in quality can be noticed, although there is no question but that the material is cleaner and more free of hydrogen. Therefore, it can be coated with less difficulty.

The information in this paper was obtained and is given through the courtesy of the Carnegie-Illinois Steel Corporation.

Henry A. Gardner Laboratory Inc., Bethesda 14, Md., has released a leaflet illustrating and describing the Heller Electronic Controlled Laboratory Mixer.

Manometer Tables—Recommended Practice RP2.1. Published by the Instrument Society of America, 1117 Wolfendale St., Pittsburgh 12, Pa. 32 pages, 8½ x 11 inches. Price: members, gratis; nonmembers, $2.00 postpaid.

This report presents abbreviations and fundamental conversion factors commonly used in manometry, recommended definitions of pressure in terms of a column of mercury and water, and for a large number of various temperatures. These data have the object of facilitating and standardizing the use of manometers and U-tubes as direct pressure indicating instruments or in the calibration of pressure recorders and controllers.



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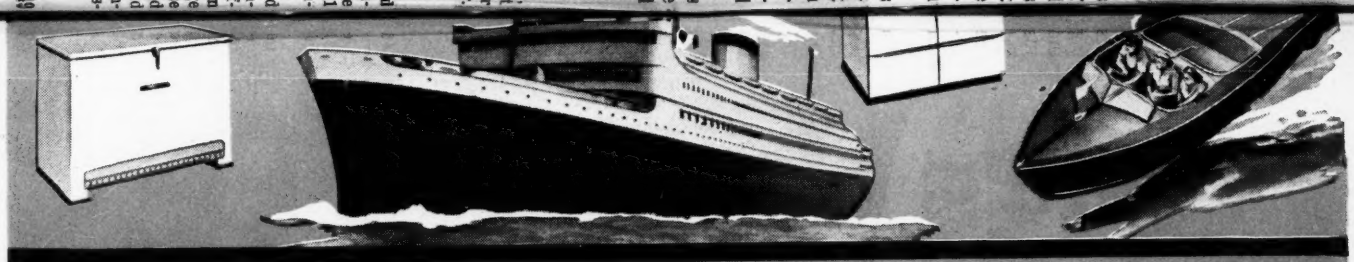

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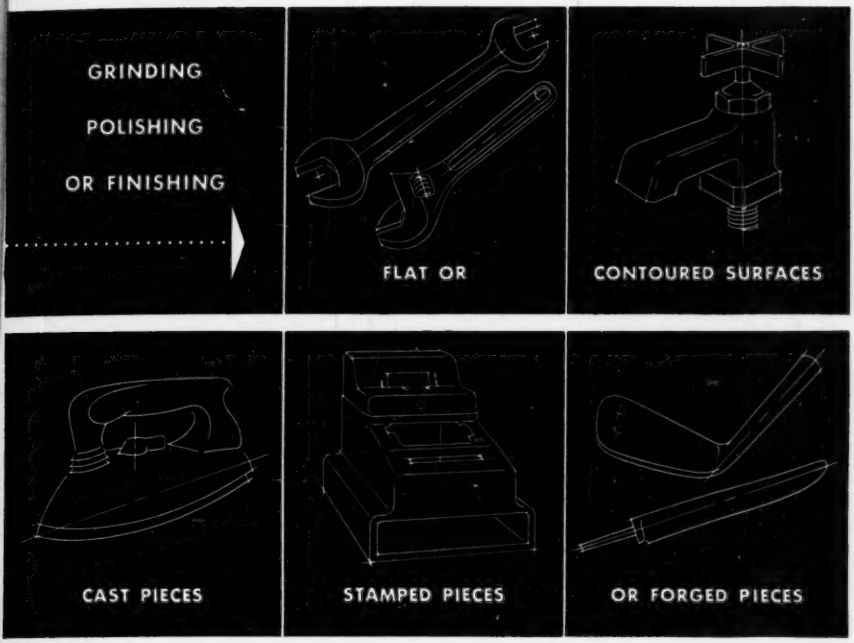
Spotlight on FINISHING Progress

Finishes for Steel Products

HOW is the manufacturer of a steel product to know just which one of the many available finishes is best suited to his purpose? The great increase in the number and variety of applications of sheet metal in product manufacturing during the past 30 or 40 years has required the development of many new grades and finishes. Thus the advantages of the desirable mechanical properties and relatively low cost of ferrous materials have been maintained by providing proper surface treatments to meet decorative and corrosion-resisting requirements. This was the viewpoint brought out by Reid L. Kenyon, associate director, Research Laboratories, Armco Steel Corporation, in a discussion of modern methods for finishing steel products before a meeting of the Boston Chapter of the American Society for Metals.

It was emphasized by Kenyon that today there is a special sheet for practically every special use. Part of this has come from a better understanding of the physical, chemical, and metallurgical requirements for these special finishing applications. The curves shown in Fig. 1, based on the American Iron and Steel Institute Annual Reports on Production, were presented by Kenyon to show the steady increase in the tonnage production of sheet, strip, and tin plate. The minor variations from year to

If you are...



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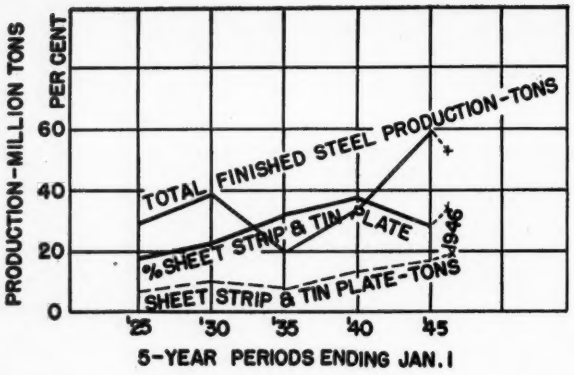

Fig. 1—Production of sheet, strip, and tin plate in relation to total production of finished steel in U. S. 1925-46. Without developments in surface treatments, it is doubtful whether sheet iron and steel could ever have become so widely adapted to the multitude of applications in which they are now employed.
(Illustration courtesy American Iron & Steel Institute)

year have been minimized by plotting averages over five-year periods. It is significant that the proportion of sheet, strip, and tin plate to total production of finished steel has steadily increased. The only exception to this is the period of World War II when the plate tonnage increased greatly. This caused a drop in percentage of sheet, strip, and tin plate, although the average total tons of these products was the highest for any five-year period since 1920. In 1940 the sheet, strip, and tin plate tonnage was about three times what it was in 1920, while the total tonnage of finished steel has increased twice as much over 1920 production as total finished steel.

It has long been realized that some surface coating is required to protect ferrous metals from corrosion. Sheet steel, as used in many applications, requires decorative effects; as a result, efforts that have gone into processes to provide protection have also included enhancement of the beauty of the surface.

Five main types of surface finishes, applicable to flat rolled ferrous metals, were discussed by Kenyon: (1) nonmetallic finishes, such as paint and lacquer; (2) metal coatings, such as electroplated copper, nickel, and chromium, and hot dipped coatings, examples of which are galvanized, tin, terne, and aluminized; (3) a combination of metallic coatings with special treatments to receive non-metallic coatings, such as paint, lacquer or asphalts; (4) porcelain enamel; (5) special finishes on stainless steel.

Non-Metallic Finishes

The development of improved sheet surfaces and new paints and lacquers have combined to give the designer a wide variety of decorative treatments. Experience has demonstrated the increase in durable life of paint finishes applied over phosphate coated steel. In addition to increasing the adhesion of paint films to metal surfaces, the phosphate coating retards underfilm corrosion, as well as the spread of corrosion, wherever the paint film is scratched or abraded. Phosphating prior to the application of organic coatings has proven to be an important development in the finishing industry, and today is standard practice in many industries.

According to Kenyon, sheet steel manufacturers realized the advantages of applying the phosphate treatment to steel sheets before shipment to the fabricator. Also, it was found that the phosphate treatment gave even better results on zinc coated sheets than on uncoated steel sheets. The embrittlement of the paint film by its reaction with the zinc was prevented by the phosphate treatment. It

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was pointed out that untreated zinc appears to act as a catalyst that initiates reactions in the paint vehicle and causes the drying up of the elastic constituents which are essential to the life of the paint or lacquer.

A whole series of these phosphate-treated, zinc plated, steel sheets is now being manufactured by the sheet steel industry. The amount of zinc coating may vary depending on the type of service. Very light or "flash" coatings may be used when it is necessary to prevent corrosion only during shipment and storage of the sheets until they are fabricated and painted. This grade of sheet is used widely with organic finishes when service conditions do not indicate severe corrosion. Examples are: toys, metal furniture, steel partitions, soft drink refrigerator cabinets and heating furnaces, such as shown in Fig. 2, as well as objects that receive lithographed or decorative treatment.

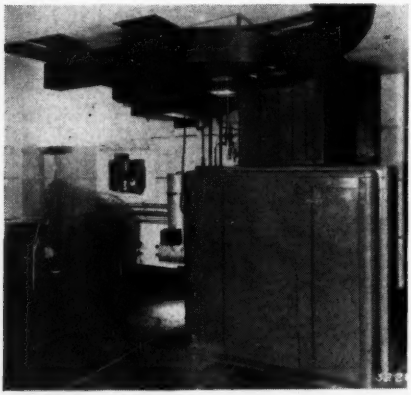


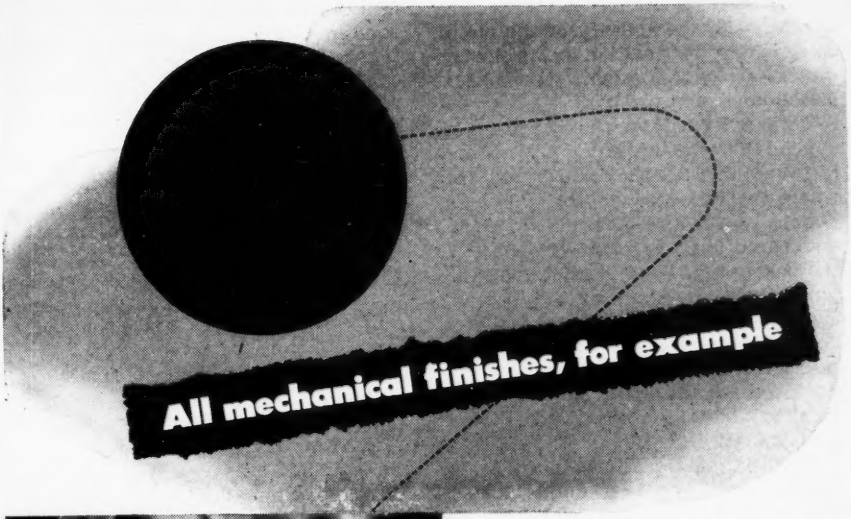
Fig. 2—The excellent paint holding properties of phosphate coated, zinc plated sheets are utilized to advantage in the manufacture of home heating furnaces such as shown here. *(Photo courtesy Armco Steel Corp., Middletown, Ohio)*

Along with the development of improved sheet surfaces, new methods for application of organic finishes have appeared. The spray gun has practically displaced the paint brush in many applications; also, further improvements have been made by spraying in an electrostatic field to give a more uniform paint film and save on finishing materials. Improvements have also been made in dipping, roller coating, and lithographing methods. When bottle caps, toys, trays, cans, and similar objects are lithographed, the decoration is often applied to the flat surface before forming. Good adherence of the paint or lacquer makes this possible without damage to the finish, provided a layer of paper is used to prevent scratching by the dies. Photographic reproduction of wood grain on steel panels has become so perfect that only close examination discloses that it is not real wood. Figure 3, showing the lobby of the Armco Research Laboratories, is an example of this type of decorative finishing on steel panels.

It was also pointed out by Kenyon that heavier zinc coatings, up to 1-2 oz./sq. ft. are also phosphate-treated. These find application for commercial refrigeration, truck and railroad car bodies, highway signs, metal buildings, and in other services where corrosion is likely to be severe. Metal awnings and painted roofing material also present ideal applications since both paint holding and corrosion resistance are required. The beautiful exteriors of our streamlined trains can be preserved longer by ensuring good paint adherence and corrosion resistance with the use of this special treatment on galvanized sheets.

Metallic Coatings

A variety of metallic coatings is available to protect steel base metal from corrosion, and in many cases to provide decorative effects. The choice of metal coatings depends on several factors such as: (1) resistance to corrosion; (2) response of the metal to known coating methods; (3) appearance; and (4) cost.



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Corrosion resistance of the coating is related to the activity of the metal, as shown by its position in the electromotive series, and also by the nature of the corrosion products. Actual protection afforded by the coating also depends on the tendency for electrolytic action with the iron base metal, wherever the latter may be exposed at punched holes and sheared edges. Zinc and aluminum are more protective to the base metal than lead, tin, chromium, or copper. Some of the methods used for applying metal coatings are: hot dipping; electroplating; chemical displacement; cementation with metallic powders, and metal spraying. Hot dipping and electroplating are most widely used.

According to Kenyon, only a few metals meet the two main requirements for hot dipping; namely, low melting point and ability to wet the steel surface. Zinc, tin, terne metal, and aluminum are the "big four" applied to steel surfaces by hot dipping methods. The most widely used hot dipped coating is zinc; factors contributing to this are the relatively low cost of zinc compared to other non-ferrous metals and its good wetting action on steel. The good corrosion resistance of zinc coatings has also been an important factor in extending the use of galvanized sheets over a wide field, especially for atmospheric exposure and in applications where a highly decorative effect is not important.

Kenyon brought out the fact that improved adherence of galvanized coatings is obtained by special surface preparation and the addition of aluminum to the zinc. It was also brought out that a coated product of this type has displaced articles formerly hot dipped after fabricating in many manufacturing operations.

Kenyon presented photomicrographs showing structural comparisons of the hot dipped zinc coatings containing a small amount of aluminum with the straight galvanized coatings. As shown in Fig. 4, the layer of zinc-iron alloy, which is a brittle material, is greatly minimized in the case of the zinc-aluminum type of coating. Figure 5 compares the microstructure of the coating of a regular galvanized sheet

Fig. 3—Photographic reproduction of wood grain on steel panels produces an unusual type of decorative finish, as illustrated in the walls of the lobby of the research laboratory, Armco Steel Corporation.
(Photo courtesy Armco Steel Corp., Middletown, Ohio)

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Fig. 4 — Photomicrographs showing that the brittle layer of zinc-iron alloy is greatly minimized in hot dip zinc coatings containing aluminum. (Known commercially as "Zinc-grip.") Left, ordinary galvanized coating; right, galvanized coating to which has been added aluminum. (*Illustrations courtesy Armco Steel Corp., Middletown, Ohio*)

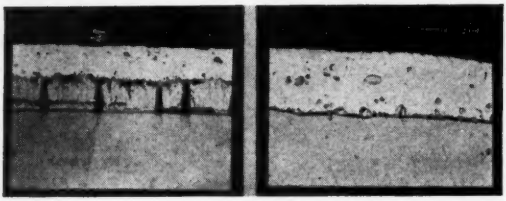


Fig. 5—Photomicrographs showing effect on galvanized coating of stretching 15 per cent. Left, ordinary galvanized coating; right, zinc coating to which has been added a small amount of aluminum. (*Illustrations courtesy Armco Steel Corp., Middletown, Ohio*)

with the zinc-aluminum type of sheet after stretching 15 per cent. The cracks in the regular galvanized coating are plainly visible, whereas the special zinc-aluminum sheet does not show this condition of the coating as a result of stretching. It was pointed out by Kenyon that, owing to the ductility of the coating and the base metal, and the adhesion properties, this type of special galvanized sheet has found many applications where the coating on regular galvanized sheets would peel from the base metal or break in the draw.

Aluminum Coated Steel

Hot dipped aluminum coatings are now being used for the protection of steel under the more severe corrosive conditions especially at elevated temperatures. Compared to galvanized steel, Aluminized steel has not only superior corrosion resistance, heat resistance, and heat reflectivity, but also a much more attractive appearance. It can be buffed to a fairly high luster. A typical application, an automobile muffler made of this material, is shown in Fig. 6. According to Kenyon, other successful uses include burners and stove parts that must resist heat. The coated product will withstand temperatures up to about 900 deg. F. without discoloration. Above this temperature the aluminum begins to alloy with the base metal but still affords good heat resistance.

Another important property of Aluminized steel, pointed out by Kenyon, is that in the presence of moisture and air it does not discolor and form white corrosion products as much as zinc coated sheets. In the absence of air, however, moisture causes a black deposit on both aluminum and Aluminized steel. This can happen when moisture condenses on piled sheets; owing to the absence of oxygen the tight aluminum oxide produced by atmospheric exposure is not formed and the

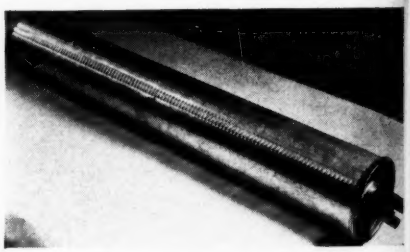
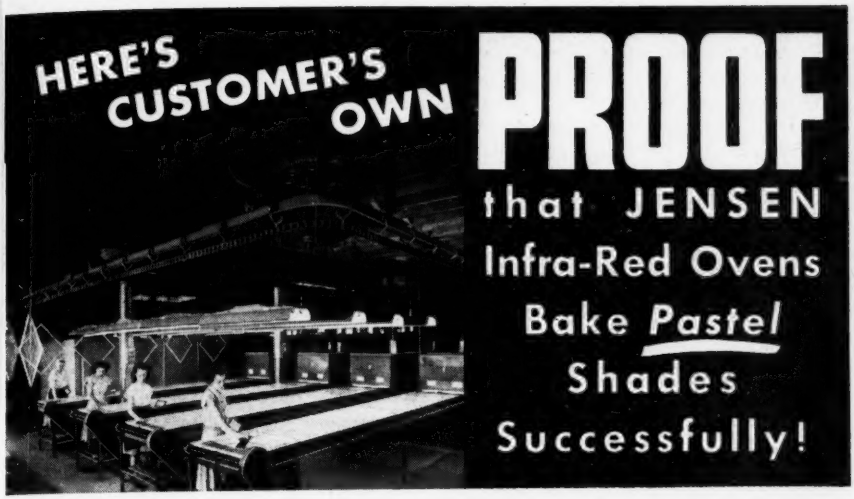


Fig. 6—Hot-dipped aluminum coatings on steel have shown good corrosion resistance under severe conditions, especially at elevated temperatures. A typical application is this automobile muffler made from Aluminized steel. (*Photo courtesy Armco Steel Corp., Middletown, Ohio*)



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corrosion products are not protective. To overcome this difficulty it is general practice to oil these sheets lightly. Because Aluminized steel does not form the loose white corrosion products characteristic of galvanized steel, it has been successfully used for such applications as spring balanced window sash parts.

Other Metallic Coatings

Although lead is an inert metal that resists corrosion, it is generally alloyed with tin (to form terne metal) to wet the steel for production of hot dipped coatings. The electropositive nature of lead relative to iron results in localized corrosion of the base metal, wherever it is exposed, or if pin holes are present. Heavy coats are sometimes used to minimize any pinhole effects. However, as most finishing engineers realize, in the manufacture of many metal products corrosion is only one consideration in the choice of a metal coating. The lead alloy coat on terne-coated sheets acts as a lubricant carrier. This aids in deep drawing, and according to Kenyon, accounts for an appreciable part of the tonnage of this grade. Both terne and tin plate have good soldering and painting qualities. Tin plate has many uses ranging from kitchen ware to cans.

Various metals may be electrodeposited on steel. Some of these, notably tin and zinc, are used primarily for protection against corrosion and are applied to sheets and strip by the steel producers. The lighter weight coatings that can be applied using electroplating methods offer important economic advantages. There are cases where the thinnest practical hot dipped zinc coating gives more protection than is justified by the economics of the product. In such cases electroplated zinc coatings are advantageous. These lightweight zinc coatings are often phosphate-treated

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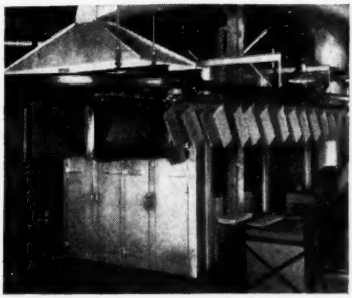

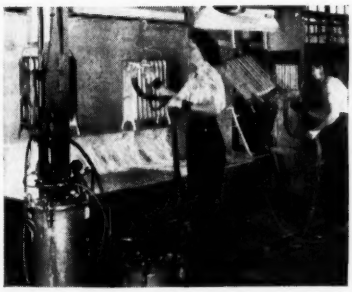

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to offer a satisfactory surface for various organic finishes. Other metals, such as copper-nickel-chromium, are also electroplated on steel but they are generally applied only to finished products. This combination offers great decorative possibilities as well as corrosion resistance.

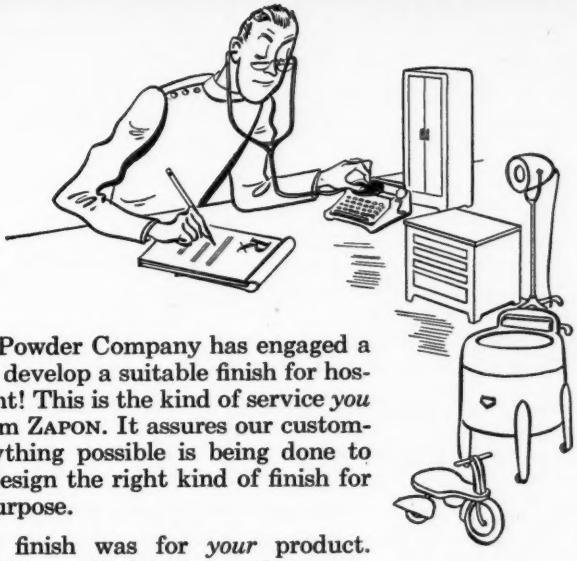
Metallic and Non-Metallic Combinations

An example of a combination of metallic and non-metallic coatings, pointed out by Kenyon, is an asbestos-bonded steel sheet. (Patented product developed by H. H. Robertson Co., Pittsburgh, Pa.) This special finish is produced by rolling a layer of asbestos felt into the zinc coating as the sheet emerges from the galvanizing bath and before the zinc has solidified on the sheet surface. This imbeds the fibers so thoroughly into the zinc that it is almost impossible to remove them. This asbestos layer is then impregnated with asphalt or other bituminous materials to produce a surface very resistant to corrosion and ideal for the application of other organic coatings.

Asbestos-bonded steel sheets, according to Kenyon, were first developed to protect corrugated culverts from abrasion by sand or gravel during periods of heavy run-off of surface drainage. Blast plates for tunnels and railroad underpasses, refrigerator brine tanks, sewer pipe, and marine exposures are other uses for this specially finished product.

Porcelain Enameling

Porcelain enameling sheets have been adapted to the manufacture of many products. Porcelain enamel coatings have already proved themselves as finishes for household equipment as well as architectural forms. There is a trend in porcelain enamel toward fewer and thinner coats. Also, special enameling sheets have been developed to reduce application problems and minimize rejects.



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Finishes on Stainless Steel

Kenyon brought out the fact that many finishing engineers, at first thought, probably feel that stainless steel does not need surface treatment; as a matter of fact, there are many different surface treatments applied to stainless steel. Surface treatment is important, because in the first place stainless steel must be clean and free from all oxide scale and pits if it is to perform true to its name. In the second place, to bring out the beauty of this material it is necessary to polish it to various degrees of smoothness and brightness, according to the intended use.

Stainless steel sheets are marketed in several finishes, all of which are corrosion resistant. In the matter of selection of the right material for the right product, as related to finishing operations, the manufacturer may be interested in the following types of finished stainless steel sheets, as classified by Kenyon. A bright, cold rolled finish, designated as No. 2B, is widely used and makes an excellent base for mechanical polishing after fabricating operations. This finish can also be given a high luster by electropolishing after fabrication. The No. 4 finish is the next degree of polish available on stainless steel sheets. It is produced by mechanical polishing on special machines in the steel producers' plants. In this process the sheets are first smoothed with 80 grit abrasive with grease as lubricant, and are finally polished with a 120 grit belt to obtain this No. 4 finish. The No. 6 finish is made by polishing No. 4 finish sheets with a Tampico brush loaded with pumice suspended in engine oil and kerosene. This finish has a soft silvery luster and is used where high reflectivity is undesirable. The No. 7 finish is a high luster polish, and is also made from sheets with No. 4 finish. In this case, however, fine abra-

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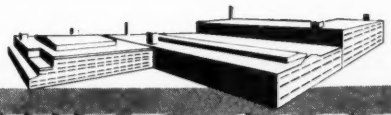

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sives on soft muslin wheels are used. After first using No. 150 grit and then No. 180 grit, the sheets are finally buffed. The finish has high reflectivity and is used where this property or the accompanying smoothness is required. A still higher polished sheet, obtained by additional buffing, is designated as No. 8 mirror finish. A high luster can also be produced by electropolishing, and is effectively used on many types of fabricated articles.

To be in the best possible condition for resisting corrosion, stainless steel surfaces must be free from dirt, oxide, and iron particles. It is important that cleanliness be maintained in the fabrication and use of this material. For example, the scouring action in the steel drawing dies may cause a small amount of steel to be abraded onto the surface of the stainless steel. Unless this is removed with stainless steel wool, or preferably by a nitric acid pickle, these steel particles will rust. This discolors the stainless steel and if not removed may lead to a localized attack on the stainless steel itself. Another advantage of the high polish on stainless steel is that the smoothness of the surface minimizes the collection of dirt and residues that might cause contact corrosion.

Manufacturers of metal products are giving more and more consideration to the use of the right finish on the right product. That finish is the one that will give the most efficient service the expected life of the product.

* * *

Porosity Tests for Electroplated Coatings

THE protective value of coatings of the more noble type, such as copper, nickel, and chromium on steel is generally recognized to depend to a large extent upon the freedom from porosity of the coatings, as these metal coatings are not rapidly attacked, even in industrial locations. It has been difficult to study the causes and effects of pores in electrodeposited coatings because of lack of quantitative methods for detecting and evaluating porosity. In Research Project No. 6 of the American Electroplaters' Society, N. Thon and associates at Princeton University have compiled an extensive bibliography and review of the porosity of electrodeposited metals.

As a part of this investigation, a study is being carried out upon the intrinsic permeability of electroplated coatings, based on the use of nickel foils that have been deposited upon, and stripped from, stainless steel. The rates of passage of air or other gases through these thin foils, in which no pores can be detected by light transmission, have been measured. In general the results show that characteristic and reproducible permeabilities are

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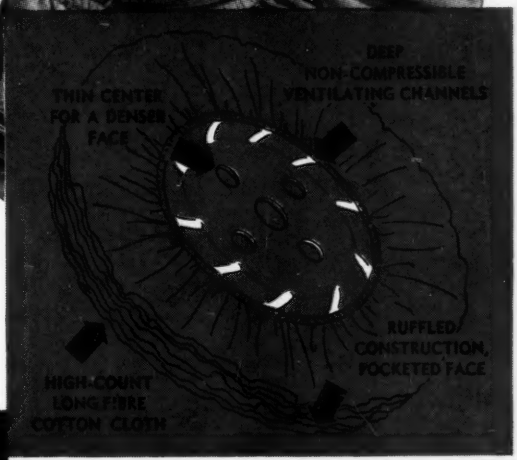
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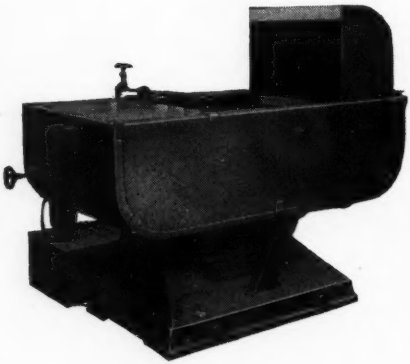

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being measured. These permeabilities are proportional to the pressure differences, and inversely proportional to the densities of the gases. Evidence is that they approach zero with nickel foils more than about 0.0002 in. thick. Further work will probably bring out the relation between the intrinsic permeability of plated coatings and their protective value.

Other methods are used for evaluating porosity and its relation to corrosion resistance. The Salt Spray Test is used as a measure of the porosity of nickel or composite coatings on steel or zinc. At best, it is generally considered to be a measure of the quality of the coating, and not of its protective value in any given environment except as such a relation has been established by experience. Considerable progress has been made in recent years in defining the conditions for operation of the salt spray test so that reproducible results can be obtained.

The Ferroxyl Test for porosity of coatings on steel depends upon the application of a reagent containing a corroding agent, usually sodium chloride, and potassium ferricyanide. The latter yields spots of Prussian blue wherever the steel is attacked through pores. The reagent may be applied as a viscous solution, a spray, or by means of moistened paper previously saturated with the solution. Certain published results indicate that the reagent may attack the nickel coating and produce pores where none previously existed. To reduce this attack it has been proposed to greatly reduce the concentration of the test reagents. In one modification, the paper contains sodium chloride and is later "developed" by immersion in a ferricyanide solution.

The Electrographic Method has been used for the determination of porosity of metallic coatings. In this test a flat surface of the coated article is made

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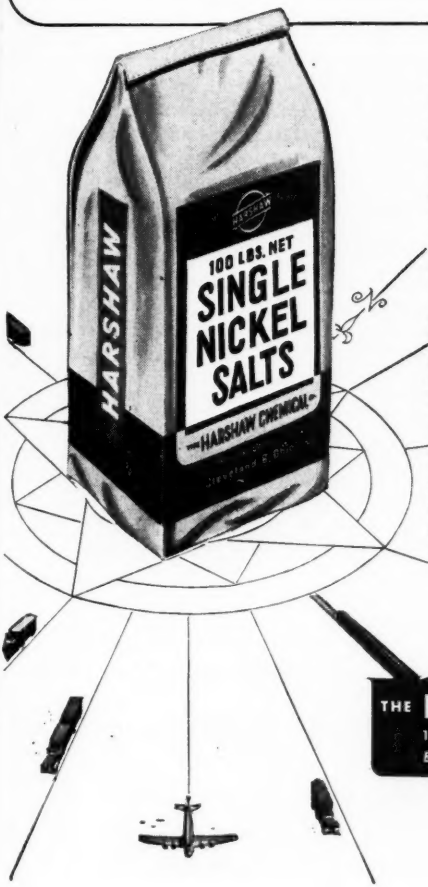

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the anode for a few seconds in a "sandwich" type of cell under pressure in which the cathode consists of aluminum or other metal not yielding colored compounds. A double layer of filter paper moistened with 5 per cent sodium carbonate and 1 per cent sodium chloride solution or an acceptable substitute serves as the intervening electrolyte.

Sufficient potential is applied to the cell to overcome couple action between the coating and exposed base metal, and the current is permitted to flow for a controlled period of 5-15 seconds. The paper member of the cell sandwich is removed and immersed in a solution containing an anion that, with the cations of the base metal, precipitates as identifiable colored compound. It has been reported that the procedure may be simplified by having the indicating agent in the paper of the cell before test. For some coatings on steel a suitable impregnant is potassium ferrocyanide, where the pinholes in the coating are revealed by the appearance of spots of Turnbull's blue.

* * *

Recent Developments in Paint Removers

ONE important fact to remember in refinishing operations is that properly formulated chemical paint strippers can loosen coatings from surfaces without injuring them, and with sufficient savings in labor to make the cost of the materials relatively slight. Since paint removers work by penetrating the coating of paint and loosening its bond upon the surface to be cleaned, it follows that the better the organic coating, the better must be the stripper. The tremendous advances in the field of paints, varnishes, and other protective coatings during recent years has also required development of improved paint removers. Many of the newer finishes are tougher, more adherent, and more resistant to deterioration than those previously used.

In a discussion of new developments in the formulation of paint removers in "Chemical Industries" (March 1949), Cornelia T. Snell, Foster D. Snell, Inc., New York City, brought out the fact that modern paint removers usually contain a number of ingredients to provide an all-around product which will meet as many of the following objectives as possible: (1) rapidity of action; (2) low volatility; (3) proper viscosity; (4) non-toxicity; (5) low flammability (for some types); (6) clean rinsability; (7) non-corrosiveness; (8) stability during storage.

Of the various types of paint removers used, according to Snell, the solvent types are the most popular. Earlier formulations which can still be used successfully on many finishes were based mainly on a simple mixture of solvents with a small amount of paraffin to cut down on volatility. In

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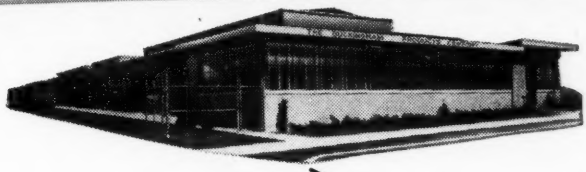

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preparing the composition the wax is melted, and then diluted with a mixture of benzene and acetone. Upon stirring in industrial alcohol, the wax is dispersed throughout the mixture in a very fine suspension. A typical composition that was described has the following formulation:

Acetone	43 gal.
Benzene	38 gal.
Paraffin	90 gal.
Ethanol	38 gal.

Other types of modern paint removers may contain one or more volatile solvents which will have a dissolving effect on the paint film; a chlorinated solvent to reduce flammability; a wax to reduce volatility; a dispersing agent to blend in the wax; and a surface active agent to promote penetration and free-rinsability.

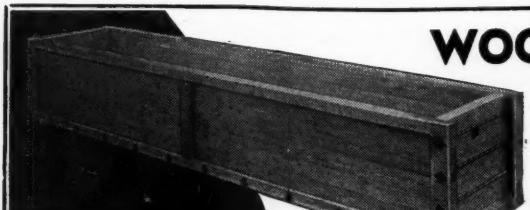
After the stripper has effected removal of the coating, it is important that all the residual wax be removed from the surface prior to repainting. A thin film can affect the adhesion of the new finish and slow its drying. For this reason, it is desirable to keep the wax content as low as good performance will permit. To ensure complete removal of the wax, it is good practice to sponge the surface with a solvent, such as benzene, after the organic coating has been removed. The objectionable residue left, when large amounts of wax are used to thicken paint removal mixtures, has been responsible for the introduction of other thickening agents. It was pointed out by Snell, in presenting the important points of this phase of paint removal, that some of the materials used include starch, wood flour, cellulose acetate, as well as the newer cellulose derivatives like methyl cellulose. Other innovations include the use of amines to promote wetting power and penetration of the paint film. Other wetting agents include petroleum sulfonate and ethylene glycol monobutyl ether. It was pointed out that these not only give greater surface penetration, but aid in emulsifying the wax so that stable products can be produced. Moreover, their surface active properties make rinsing of residual remover much easier as well as more complete.

A fairly simple formulation of a scrape-off type paint remover, that was suggested by Snell, has the following composition:

Methylene Chloride	90 gal.
Methanol	10 gal.
"Methocel", 4000 cps. (Dow Chemical Co. methyl cellulose)	11.0 lb.
Paraffin	16.5 lb.

Other modified formulations can be used as flush-off type removers.

Other different types of paint remover are based on the use of aqueous solutions of caustic alkali. Strong alkalies can be used on iron, steel, brass and copper, but not on aluminum, zinc and cadmium because of chemical attack on the metal itself. With this



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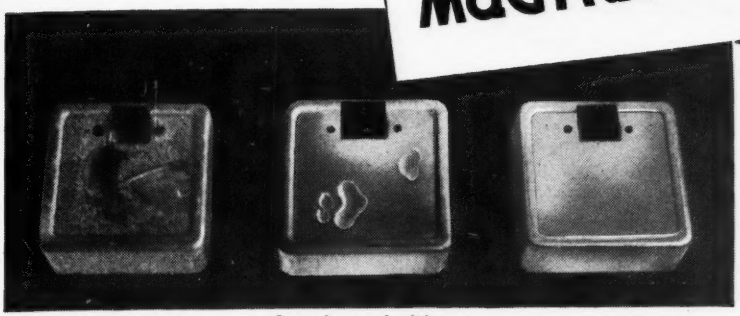

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last group of metals, Snell reported that cresylic acid can be used as a paint stripper without harming the base metal.

* * *

Chromate Gelatine Films On Aluminum

A NEW method, known as the "Framalite" process, for applying corrosion resistant chromate films to aluminum surfaces has been described by J. Frasch in the French Journal, METAUX & CORROSION (Nov., 1948). The process uses zinc or manganese bichromate in a gelatine solution, maintained in the pH range 4-5.2, for most effective application. The solution may be applied to the metal surface by dipping or with a spray gun, sponge or brush. After the gelatine solution is applied to the metal, it was reported that the evaporation of the water solvent changes the concentration of the gelatine and bichromate so as to cause the gelatine to become insoluble in water. As a result, it was stated that a chromate-containing insoluble film is formed which protects the metal against corrosion.

The thin yellow film so formed was reported to be sufficiently adherent that coated parts may be subsequently formed. In describing the commercial applications technique, one requisite brought out was that parts to be coated should be clean and grease-free. Within 15 to 45 min. after application of the coating, the film is dry to the touch, but 48 hours at room temperature or 10 to 15 minutes at 210-230 deg. F. are necessary for the gelatine to become completely insoluble. Aluminum parts treated by this process were described as being satisfactory for subsequent dyeing or painting. Corrosion resistance was reported to be comparable with that of anodically treated aluminum.

* * *

Primers For Light Metals

MOST finishing engineers realize the importance of selection of proper primer systems in finishing light metal alloys. The protection afforded to aluminum and magnesium alloys by various paint primers in rural, industrial, and marine atmospheres is the subject of a report by J. G. Rigg and E. W. Skerrey in the October 1948 issue of "Journal of The Institute of Metals." The four pigments studied were zinc chromate, zinc tetraoxychromate, iron oxide, and red lead. The specimens were exposure tested under the following conditions: (1) untreated; (2) with pre-treatment as used for painting; (3) with one coat of primer only; (4) with two coats of primer and one of top coat.

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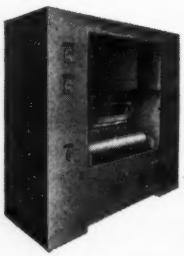
Preliminary results indicate that red lead primers are unsuitable for light metals because the red lead accelerates the corrosion of these metals. It was pointed out that the more anodic magnesium alloys show this effect more markedly than the other metals and are corroded even in the rural atmospheres. Also the effect of the red lead becomes marked as the corrosion conditions become more severe and as the purity of the base metal is lowered.

The experimenters pointed out that no acceleration of corrosion has been observed with any of the other paint systems. Preliminary indications are that iron oxide has considerable merit as a priming pigment on light metals and is providing useful protection even in the more saline atmospheres. However, the chromates were reported to be the most successful primers for general use on all of the light metals included in the tests.



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"The Tale of the Powdered Pig," a new sound and color film, has been released by the Reynolds Metals Co., Louisville, Ky. The film describes the uses to which aluminum powders and pastes are put, ranging from polychromatic finish on automobiles to pyrotechnics and the coloring of myriad business and household appliances.

The process of converting bauxite into aluminum is described briefly so that the audience can better assimilate the intricate procedures which are necessary before the powder is ready to be made into paints. Scenes in Reynolds research laboratories show how new uses for the powder are being discovered.

The 16 mm. film has a running time of 30 minutes. It is being made available for screening before technical groups in the paint industry and educational organizations. Requests for bookings should be directed to Reynolds Metals Co., Motion Picture Dept., 821 E. 12th St., Louisville 1, Kentucky.

"Karbate" Brand Sulfuric Acid Diluting Equipment. Catalog Section M-8806A, available from the National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y., describes a complete system for the efficient production of cool dilute sulfuric acid from the required quantities of commercial strength acid and diluting water.

Reflectometer Bulletin. Two new portable instruments, the 60° Glossmeter and the 45°-0° Reflectometer which have been designed to fill the need of many laboratories for simple, rugged, and inexpensive apparatus to take reflectance and gloss measurements, are treated in an eight-page bulletin prepared by Henry A. Gardner Laboratory, Inc., Bethesda 14, Maryland.

Physical Properties of Electrodeposited Metals—A.E.S. Research Project No. 9. Published by the American Electroplaters' Society, P. O. Box 168, Jenkintown, Pa. Price, 65 cents.

This progress report is primarily concerned with the correlation of the variations in the properties of electrodeposited nickel with the conditions of deposition. Experimental results obtained in this study are reported and typical examples are given to show various trends.

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Yet 80 seconds' spray treatment with Pennsalt Cleaner solutions enables Heintz Mfg. Company to dig that soil out . . . leaving these home washer tubs clean and ready for the pickling and porcelain enameling operations.

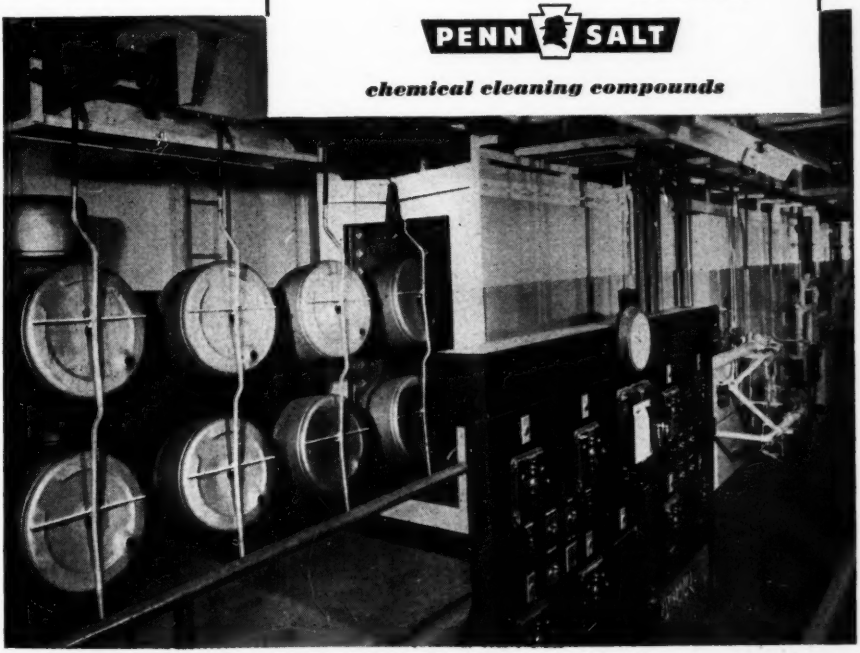
In this method, Pennsalt EC-12* and Pennsalt* 30 have done such a fast, efficient job that Heintz has had no cleaning rejects since the installation was made.

Satisfactory cleaning like this is being enjoyed all over the country by plants using Pennsalt Cleaners. Call in your Pennsalt representative, he'll be glad to discuss with you savings of time and money with Pennsalt's complete line of metal cleaners. Special Chemicals Division, Pennsylvania Salt Manufacturing Company, Philadelphia 7, Pa.

*REG. U. S. PAT. OFF.

PENN SALT

chemical cleaning compounds



PRACTICAL APPLICATIONS *of Modern Products*

Efficiency Increased at Marvel Plant by Installation of Mechanized Finishing System

THE efficiency in refrigerator production at the Sturgis, Michigan plant of Marvel Industries, Inc., has been noticeably increased since the recent installation of a completely conveyorized finishing system and other materials handling equipment according to Carl J. Wagner, Marvel president. Combination ice-and-electric refrigerators, which are used by the trailer coach industry, are produced at the plant.

The conveying system and the ovens required for the finishing operations were designed and built by Jensen Specialties Inc., Detroit. The conveyor is of the overhead monorail type; it is approximately 680 feet long and is designed to move at the rate of 5½ f.p.m. As may be seen in Fig. 1, simple fixtures are suspended at intervals along the conveyor to hold the various pieces being processed. These pieces consist of 13 different metal parts which are assembled to make the refrigerator cabinets.

At the beginning of the conveyor line, all of the parts to be processed are placed on fixtures and are not again touched by hand until all of the finishing operations are completed and the parts are ready to be assembled. In the first of the finishing operations, the parts are carried through a five-stage high-pressure spray phosphatizing system. In these five stages the parts are cleaned, hot washed, treated with Bonderite, cold washed, and treated with Parcolene by being subjected to a series of high-pressure sprays in an all-enclosed tunnel. Following the Bonderizing treatment, the parts are dried by being passed through a 10-

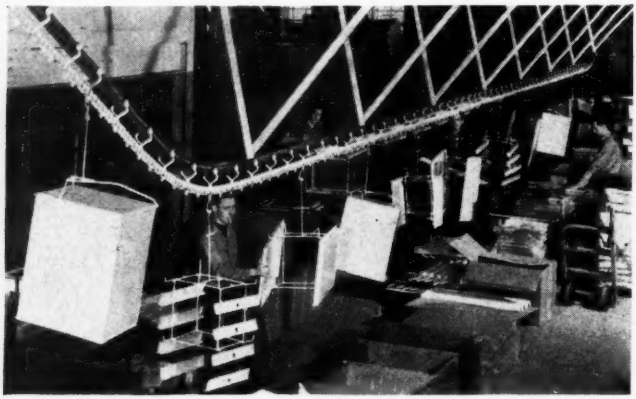


Fig. 1 — A portion of the 680-foot long Jensen overhead conveyor, showing refrigerator parts being carried along on the suspended fixtures

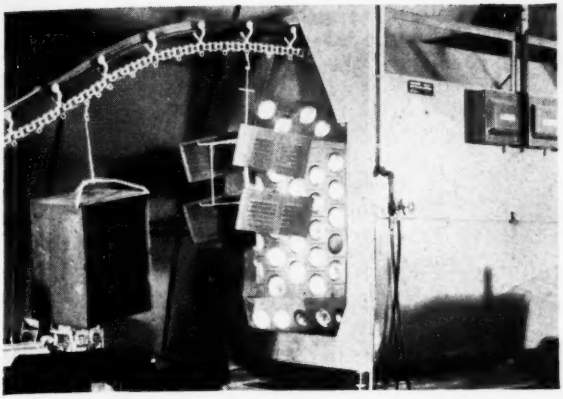


Fig. 2 — After being Bonderized, the parts are carried through a 10-foot "dual-heat" infra-red dry-off oven shown here.

foot "dual-heat" infra-red dryoff oven, as shown in Fig. 2.

The parts are next conveyed into a finishing plant which is equipped with a water wash spray booth pressurized with filtered air; and, according to the Marvel two-application process, two coats of white enamel are applied to each part, no primer being used. As illustrated in Fig. 3, the parts are then carried through a 27-foot high-bake, "dual-heat" infra-red oven for baking. The lamps in this oven are given a "nested" arrangement so that a thorough, even, and overall baking of the white enameled surfaces is obtained. The "nesting" arrangement is designed to eliminate the problem of discoloration and to reduce to a minimum the possibility of overbaked or underbaked jobs. The hard, durable finish produced is required for Marvel refrigerators which, built expressly for use in trailer coaches, are subjected to unusually rough treatment.

Following the baking operation, the parts are carried to the assembly area where they are removed from the fixtures and assembled into cabinets. With the new equipment, the rate of production is 25 cabinets per hour. A roller-type conveyor, 870 feet long, is used to facilitate cabinet assembly. Another roller-type conveyor, on which the mechanical parts for the refrigerators are carried, converges with the cabinet line to form a final assembly line.

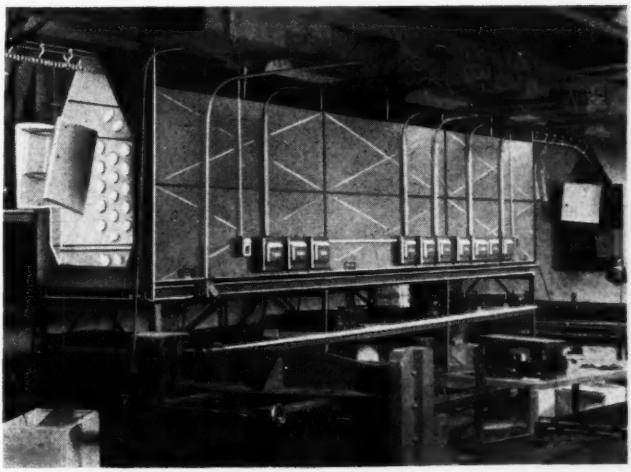


Fig. 3 — This illustration shows a 27-foot long high-bake, "dual-heat" infra-red baking oven which features a "nested" lamp arrangement.

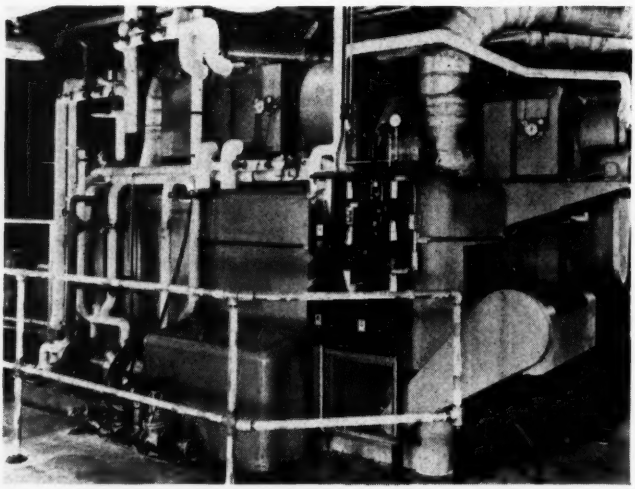
The operations described here are performed in an efficient and economical manner; and, due to the compactness of the conveying, drying, and baking equipment, a comparatively small amount of floor space is required.

Cincinnati Combination Washing Machine at Eastman Kodak

THE accompanying illustration shows a combination drum and belt conveyor type washing machine which has been installed in the Camera Works of Eastman Kodak Company for cleaning miscellaneous small parts and also tote boxes in which the parts are carried. The machine was built by the Cincinnati Cleaning & Finishing Machinery Co., Ironton, Ohio.

The machine is approximately 17 feet long x 9 feet wide x 9 feet high. The parts to be cleaned are loaded at one end of the machine, the small parts into the drum hopper and the tote boxes upside-down onto the belt. As the parts and boxes are passed through the machine, they are sprayed with solution, drained, and dried off in a hot-air blowoff section. The air for the blowoff section is heated by means of standard high pressure steam coils, and a portion of this heated air is recirculated by means of efficiently designed ductwork with damper control. The parts and boxes are discharged at the opposite end.

All of the spraying solution which is returned to the solution tank is passed over a chip sheet, into a wire mesh basket, and through a series of screens. Large chips and much foreign matter may be removed in this manner. The large solution tank (926 gallons) is welded onto one side of the machine. The tank is heated by large header-type steam coils, and the tank bottom is sloped in the direction of a drain sump so that all remaining muck and foreign matter may be removed easily. A perforated flushing pipe is provided around three sides along the bottom of the tank so that the tank bottom may be flushed out.



Cincinnati Combination Washing Machine is shown here as installed at Camera Works of Eastman Kodak Company.

NEWS of the Industry

NEW PLANTS

The **YOUNG & BERTKE CO.**, Cincinnati 14, Ohio, fabricator of dust collecting and fume removal systems, industrial ovens and finishing systems, and air conditioning and ventilating systems, announces the opening of its new Manufacturing Division.

Equipped with the most modern sheet metal fabricating equipment, the Manufacturing Division offers complete service on fabricating hot or cold rolled steel, stainless steel, brass, aluminum, and copper in complete units, sub-assemblies, or parts, either of customer or its own engineering department design.

To help meet the heavy industrial demand for trichlorethylene as a metal cleaning and oil-extraction solvent, a new manufacturing plant is to be built in Ashtabula, Ohio, by **HOOKER-DETREX INC.**

Hooker-Detrex Inc., which is owned jointly by the Hooker Electrochemical Co., Niagara Falls, N. Y., and the Detrex Corp., Detroit, Mich., built and placed in operation in 1947 a trichlorethylene manufacturing plant at Tacoma, Washington. The operation of these subsidiary plants is under the supervision of the Hooker Company, and Detrex has contracted to market its entire output.

Embodying the latest developments in safety and engineering design, and including single and multi-story buildings, the new fluorine chemical plant of the **PENNSYLVANIA SALT MANUFACTURING COMPANY**, located at Calvert City, Kentucky and occupying approximately 10 acres of a 500-acre tract, is scheduled to begin operations this month, according to an announcement by George B. Beitzel, president.

James McWhirter, formerly superintendent at Pennsalt's Natrona, Pennsylvania plant, is in charge of the new plant. A specialist in fluorine chemicals, Mr. McWhirter supervised the construction of the Calvert City Works. He is a graduate of Middleburg College and New York University.

THE CARBORUNDUM COMPANY recently completed its modern factory for the development and manufacture of coated abrasive products. Comprising more than 12 acres of floor space, the plant is located at Wheatfield, New York.

COMPANIES

E. L. Faulman, president of the **IMPERIAL PLATING RACK CO.**, 800 Industrial Ave., Flint, Mich., announces the purchase of Plating Racks Inc., Jackson, Mich. The increased facilities made possible by this consolidation will enable Imperial Plating Rack Company to widen its scope of operations in fabricating and servicing plating and anodizing racks.

The appointment of Herman H. Hobelmann as factory representative for the Black Arrow line of paint spray equipment in the northern California area, with headquarters at 420 Market Street, San Francisco, has been announced by **THE BLACK MANUFACTURING CO.**, Parkton, Maryland.

Mr. Hobelmann was formerly Western district manager for Walker-Turner, Inc.,

E. I. DU PONT DE NEMOURS AND COMPANY announces that it has discontinued the manufacture of sodium hydride and has licensed Metal Hydrides, Incorporated, Beverly, Mass., to manufacture it under Du Pont patents.

Reintroduction by the **PITTSBURGH PLATE GLASS CO.**, Pittsburgh 22, Pa., of its Bulletin Colors, consisting of 30 vivid colors approved by the Outdoor Advertising Association of America, Certificate No. 120, has been announced by E. D. Peck, general paint manager of the company's merchandising division.

THE DOW CHEMICAL CO., Midland, Mich., has announced the removal of all royalty fees from its patented process for electroplating on magnesium. The only stipulation of the new license arrangement is that the company be permitted free access to any process improvements made by the licensee. This royalty-free license is applicable in the United States only.

Dowdy Brothers, 33rd & Arch Sts., Philadelphia 4, Pa., has been appointed representative in the Philadelphia area by the **MAGNA MANUFACTURING CO., INC.**, New York 22, N. Y., manufacturer of Magnaflake metal powders and pastes. This territory covers Camden, Philadelphia, Harrisburg, and Delaware.

A plaque commemorating the completion of one million man-hours work time without a disabling injury was recently presented to Burke B. Roche, president of **BINKS MANUFACTURING CO.**, Chicago 12, Ill., by W. D. Keefer of the Lumberman's Mutual Casualty Institute.

This plaque was won as a result of a coordinated safety program which was established and enforced under the direction of the shop foremen.

In connection with its 50th anniversary, **THE MEAKER CO.**, Chicago, Ill., manufacturer of automatic plating and processing equipment, has issued a commemorative booklet describing the history of the company and its progress through the past half-century.

Formation of a new sales district encompassing New York, New Jersey, eastern Pennsylvania, Maryland, and Delaware to provide more efficient service by its Special Chemicals Division has been announced by the **PENNSYLVANIA SALT MANUFACTURING COMPANY.**

According to Joseph J. Duffy, Jr., manager of sales of the division. Horace F. McIntyre, Philadelphia representative for the Special Chemicals Division, has been appointed district sales manager. J. W. Beaver, Baltimore representative, has been transferred to this territory.

Mr. John Ireland, Director, Tin Research Institute, London, England, announces the formation of **TIN RESEARCH INSTITUTE, INCORPORATED,** an American corporation devoted to providing free technical service to consumers of tin in the United States. The office of the new corporation, located at 492 West Sixth Avenue, Columbus 1, Ohio, will, in the future, handle all inquiries or requests for technical service, while a sponsorshop will be maintained at Battelle Memorial Institute to handle new researches.

Burke B. Roche (left), president of the Binks Manufacturing Company, receiving award from W. D. Keefer

NEW POSITIONS

According to an announcement by Frederick G. Weed, president, **NEWELL P. BECKWITH** has been appointed director of research of the Rinshed Mason Company, Detroit. His duties will include complete supervision of all laboratory and field research in the company's paint, varnish, lacquer, and enamel divisions.

Newell P. Beckwith

Associated with Rinshed Mason since 1939, Mr. Beckwith is very active in Detroit and national paint association circles and particularly in the industry's efforts toward the development of technically trained men. He is chairman of the Joint Committee on Education of the National Paint, Varnish and Lacquer Association, and is serving on the finance committee, the technical education committee, and the executive committee of the Federation of Paint and Varnish Production Clubs.

J. M. O'BRIEN has been appointed assistant sales manager of Klem Chemicals, Inc., Dearborn, Mich., according to an announcement by T. Curtis McKenzie, president. Formerly Southwestern division manager for the Diversey Corporation, Mr. O'Brien will assist A. J. Pettit, general sales manager, in the company's plans for further expansion in industrial metal cleaning, as well as in other industries not previously covered.

CLARENCE W. DANIELS, plants engineer and a director of the Norton Company, retired recently after 36 years of service. He is succeeded by **ALLAN F. HARDY, JR.,** according to an announcement made by Andrew B. Holmstrom, Norton Company vice president. Mr. Daniels will continue to participate in the management of the company as a member of the board of directors to which he was first elected in 1925.

Mr. Daniels entered the employ of the Norton Company in 1913 as a draftsman. He was appointed plants engineer in 1914. He is the son of Fred H. Daniels, one of the original founders of the company in 1885.

Mr. Hardy, until his appointment, has been assistant plants engineer. He was in charge of building and equipping the company's recently completed Plant 7, an outstanding example of a grinding wheel manufacturing plant.

ELLERY HARRIS who has been associated with the Ferro Enamel Corp., Cleveland, Ohio, since 1942 has been appointed assistant general manager and technical director of the Liquid Plastics Division of the company. This division of the company manufactures baked synthetic enamels and organic industrial finishes under the trade name "Vedoc."

H. E. Beane, general sales manager of The Bristol Company, announces that **J. H. FERGUSON** has been named district manager of the branch office at 727 Grant Street, Akron 11, Ohio.

Mr. Ferguson joined Bristol as a sales engineer in 1923, and since 1940 he has been connected with the company's Washington, D. C. office.

Appointment of **HOWARD J. MATHER** as assistant general manager of industrial finishes for Pittsburgh Plate Glass Company's paint division in Pittsburgh has been announced.

Howard J. Mather

Mr. Mather has been associated with the company since 1939, serving as an industrial sales representative for the paint division in the Cleveland, Chicago and Davenport, Iowa sales territories.

Formerly general sales manager of the Industrial Filter & Pump Mfg. Co., Chicago, Ill., **JACK F. BROSSART** has been appointed Pacific Coast manager of the company. **HAROLD W. FAINT,** who has been with Industrial Filter since 1945 as manager of the Ion Exchange Department, has been named to succeed Mr. Brossart.

Metal Finishing Supplies

RAKES . . . SPINNERS . . . TUBE POLISHING MACHINES

This Modern Wheel Rake Is Economical! It Saves Buffs

You'll find this modern wheel rake safe, fast and economical. It will recondition and shape polishing wheels and buffs with a minimum loss of material and without hazard. Write for complete details and prices.

Tube Polishing Machines Improve Workmanship

Rubber rolls tapered against each other drive tubing across face of polishing wheel or abrasive belt. Tube machine produces a uniform finish, free from spiraling. It polishes tubes from ¾" to 5" in diameter.

Work Holding Spinners For Uniform High Speed Polishing and Buffing

Here's a spinner for holding work and producing uniform high speed polishing and buffing. It has totally enclosed grease packed ball bearing construction. Removable fixture flange has machined face and screw holes for attaching wood block or other fixtures. Write for complete literature and price quotation.

Selective Distributorships Available

The **Manderscheid** COMPANY

810 FULTON STREET
CHICAGO 7, ILLINOIS

BACKSTAND IDLERS • CONTACT WHEELS • TUBE POLISHING MACHINE • SPINNERS • BUFFING WHEEL RAKES • POLISHING WHEEL BUSHINGS • POLISHING LATHE WRENCHES, FLANGES, COLLARS & NUTS • SCREW POINTS • EMERY TROUGHS • BALANCE WEIGHTS & WAYS • TUBE SUPPORT STAND •

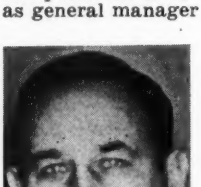
• METAL FINISHING SUPPLIES AND EQUIPMENT •

Don C. Blum

Wagner Brothers, Inc., Detroit, Mich., will be represented in the New York State area by **DON C. BLUM**, whose headquarters will be at 322 Genesee Parl Blvd., Rochester.

Mr. Blum's past experience includes four years as a sales and service engineer and six years in charge of plating and metal finishing at Rochester Products. He is a member and former officer of the Rochester Branch of the American Electroplaters' Society.

At the recent meeting of the board of directors, **JOHN A. CARTER** was elected president of Oakite Products, Inc., New York, N. Y. He has been associated with the organization for 34 years, serving in recent years as assistant to the president and, since December 1947, as general manager of the company.



John A. Carter

D. C. BALL, founder and president of Oakite, was named chairman of the board. Also announced at the meeting was the election of **DAVID S. BALL**, former vice president, to the newly created office of first vice president, as well as the re-election of **H. LIGGETT GRAY** as treasurer and **DAVID A. HEARN** as secretary.

At a meeting of stockholders of the American-Marietta Company, **F. WILLIAM HARDER** was elected to the board of directors.

Mr. Harder is a member of the New York investment banking firm of Allen & Company, director of the American Bosch Corporation, and assistant to the chairman of the board of The Colorado Fuel & Iron Corporation.

G. B. WORK has been appointed general manager of the Industrial Finishes Department of the Atlas Powder Company, succeeding **E. H. BUCY**, who has been transferred to the general office of the company at Wilmington, Delaware, for special duties.

G. B. Work

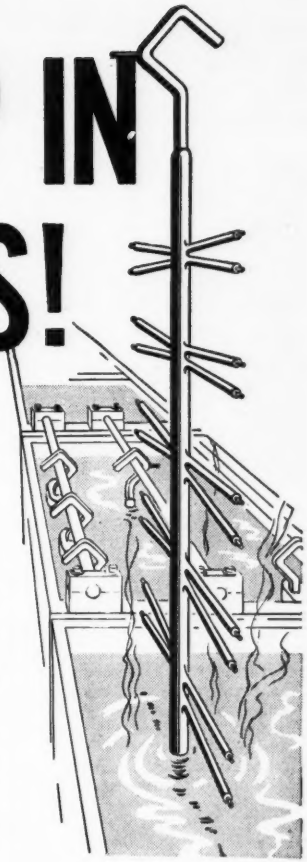
Mr. Work will have full managerial authority over the manufacturing, selling, and technical operations of this department, which was formerly known as the Zapon Division, including both the Stamford, Connecticut and North Chicago, Illinois divisions. He will make his headquarters at Stamford.

The Norton Company, Worcester, Mass., recently established a new district in the St. Louis, Missouri area in charge of **R. O. ANDERSON**, district manager, who will move his headquarters from Denver, Colorado, to St. Louis. This district will include territories which previously composed the Rocky Mountain and South Central districts, now discontinued, and two areas formerly in the Chicago district. **H. G. BRUSTLIN** has been appointed abrasive engineer in charge of the Denver territory and will make his headquarters there.

The appointment of **RICHARD A. WEPPNER** to the sales staff of Pennsylvania Salt Manufacturing Company's Special Chemicals Division, has been announced by Joseph J. Duffy, Jr., sales manager of the division.

Weppner, who for two and one-half years during the war served as chairman of the chemical branch of the War Production Board's Conservation Division, will take over active sales work in the East on Pennsalt resistant cements and paints.

STANDS UP IN ALL CYCLES!



Outstanding rack protection achieved by plastisol Unichrome COATING 218X

No matter what you need in rack protective qualities, Coating 218X has it. Resistance to vapor degreasing? Coating 218X has that! Ability to stand up in hot cyanides or caustics? In chromium plating? Again 218X is the answer. And if it can withstand *those* plating operations, it will take them *all.*

In test runs at a well known plating plant, for example, Coating 218X was put through a cycle including soak cleaners, anodic alkaline cleaner, cyanide dip, acid dips, nickel plate, chromium plate and chromium strip. There was still no attack after *840 cycles,* at which time the attempt to break down Coating 218X was abandoned!

Physically, too, Coating 218X leads. It won't chip, resists cutting and abrasion, minimizes dragout. All in all, it's easy to see why your rack coating costs will hit bottom with Coating 218X. Write today for prices.

(NOTE: Applicators nearby can bake 218X onto your racks if you have no facilities for applying it. Ask for names.)

UNICHROME

Trade Mark Reg. U.S. Pat. Off.

RACK COATINGS—Products of

UNITED CHROMIUM, INCORPORATED • 51 E. 42nd St., New York 17, N.Y.

Detroit 7, Mich. • Waterbury 90, Conn. • Chicago 4, Ill. • Dayton 2, Ohio • Los Angeles 13, Cal.

At their annual meeting, directors of the Binks Manufacturing Co., Chicago, Ill., elected president **J. F. ROCHE** as chairman of the board. He is succeeded in the presidency by his son, **BURKE B. ROCHE.**

J. F. Roche (left), Burke B. Roche

J. F. Roche was made executive vice president in 1928, and he has served as president of the company since 1936.

Burke B. Roche was elected vice president in 1948 and has been in charge of the Industrial Division. After graduating from Loyola University, he attended Northwestern and De Paul Law Schools. He was admitted to the Illinois Bar in 1939 and, the same year, entered upon his business career with the Binks Company. He installed finishing equipment in the Kingsbury (Indiana) Ordnance Works, one of the largest installations ever made. He later graduated from the Naval Ordnance School at the Naval Gun Factory, Washington, D. C., and served as a naval ordnance officer in the Pacific theater of operations during the war.

FRANK P. CONNOLLY, vice-president and general sales manager of Valentine & Company, was elected president of the New York Paint, Varnish and Lacquer Association at the annual meeting, May 12, at the Hotel Biltmore, New York City.

Mr. Connolly is also chairman of the National Paint, Varnish and Lacquer Association Color Committee, vice president of the New York Sales Executives Club, and a contributor to business and trade magazines.

RALPH M. JOHNSON, vice president in charge of sales, Norton Co., Worcester, Mass., was elected second vice president of the American Supply and Machinery Manufacturers' Association, Inc., at the annual spring convention held in Cleveland, Ohio.

C. LEONARD SHAW, publicity manager for Norton Company, was reappointed to the publicity committee of A.S.M.M.A.

HONORS

WALTER R. COLEY, a vice president of Leeds & Northrup Company, Philadelphia, retired May 31 after 43 years' service with the firm.

On the occasion of his retirement, Mr. Coley was the guest of honor at a dinner party held at the Germantown Cricket Club, at which time he was presented with a set of three sterling silver trays.

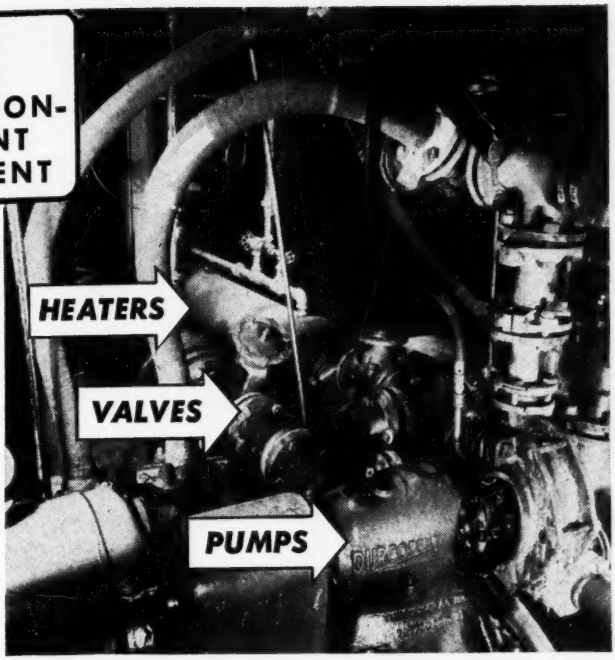
Active in the formation of the Leeds & Northrup Co-Operative Association, Mr. Coley also participated in the formation of the L&N Relief Association, and was on the committee which wrote the first constitution of the company's Athletic Association.

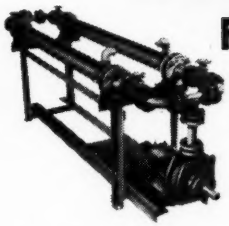
CARL E. STAKEY has recently completed 25 years of service with the D. J. Murray Manufacturing Co., Wausau, Wis., as general manager since 1930 and as executive vice president since 1942. Prior to his association with the firm, he was in the machine shop field in Duluth, Minnesota.

A 55-year employee took the spotlight when Manhattan Rubber Division, Raybestos-Manhattan, Inc., Passaic, N. J., recently honored its 600 "Pioneers" at a dinner. **CHARLES KUHN,** New York branch salesman with 55 years of continuous service, is the senior member of the organization made up of employees who have been with the company 25 years or more. Four other retired Pioneers with 50 or more years of service were introduced as the "Deans" of the organization.

Thirty-two new members became Pioneers and were presented with pins. Members entering new five-year service groups received emblems with diamonds indicating length of service. There are now 369 active Pioneers, 79 retired, and 157 deceased.

DURCO
CORROSION-RESISTANT EQUIPMENT





Standard Durco "packaged" units are available with one to nine or more heat exchangers in banks—together with the necessary corrosion-resistant valves, pipe, fittings and pumps—supported on one frame. For further information on typical layouts ask for folder T.

FOR CORROSIVE PLATING SOLUTIONS

These Durco heat exchangers, pumps and valves safely handle Watts nickel plating solution at the Lukens Steel Co., Coatesville, Pa.

Durco equipment is able to withstand corrosive service like this because every part that comes in contact with the corrosive is made of DURIRON. This Durco high silicon iron is completely resistant to practically every plating solution... copper, chrome, nickel and others.

For maximum plating service with minimum maintenance, specify Durco equipment.

For further information—on Durco valves write for Bul. 610; on Durco pumps write for Bul. 815; on Durco heat exchangers write for Bul. 1603.

THE DURIRON CO., INC., DAYTON 1, OHIO
Branch Offices in Principal Cities

DURCO
CORROSION RESISTING ALLOYS & EQUIPMENT

DURCO Adv. 68-GM

(Left to right): Wm. Hogenson, Chicago Vit president; Roger L. Fellows; Raymond R. Brown; and E. Hogenson, executive vice president.

ROGER L. FELLOWS, assistant director of research, and **RAYMOND R. BROWN,** auditor, recently completed 25 years' service as members of the Chicago Vitreous Enamel Product Company organization. The event was celebrated by a quarter-century" banquet held in their honor, during which they were presented with engraved watches.

SOCIETIES

A fellowship leading to the degree of master of science in chemical engineering at Illinois Institute of Technology will be given by the **CHICAGO PAINT AND VARNISH PRODUCTION CLUB** and the **CHICAGO PAINT, VARNISH AND LACQUER ASSOCIATION** for the academic year 1949-50.

The fellowship, based on results of a competitive examination, grants $1,000 to the winner plus $550 tuition for two semesters.

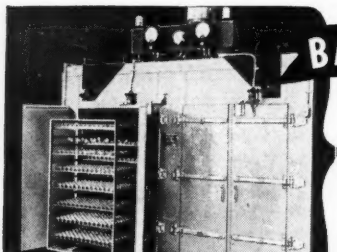
If two veterans eligible for benefits under the G. I. Bill of Rights qualify for the fellowship, the award may be divided. One-half of the fellowship will then be awarded to each of two candidates with tuition payments covered by the G. I. Bill.

Applications should be sent to William A. Lewis, dean of the graduate school, Illinois Institute of Technology, Chicago 16, before July 15. Announcements of the winner or winners will be made to all applicants by August 1.

George W. Russell, assistant sales manager of American Cyanamid Company's Industrial Chemicals Division, was elected president of the **CHEMICAL MARKET RESEARCH ASSOCIATION** at that organization's Annual Business Meeting held in the Hotel Biltmore, New York City.

Mr. Russell, who has been active in new product development and market research for a number of years, has been a member of the organization since 1947 and during the past two years has served as chairman of the Publications Committee and the Program Committee.

The Chemical Market Research Association was organized in 1940 and its membership consists of market research specialists from about 90 leading chemical companies of the United States and Canada. The objectives of the organization are the advancement of chemical market research in theory, practice and application, and the maintenance of high professional and ethical standards among its members.



BAKING and DRYING OVENS

For Processing • Varnish Baking • Paint and Lacquer Drying • Lithographing and Decorating. Batch or Conveyor Types for any fuel. Write for Bulletin 5.

YOUNG BROTHERS COMPANY

2011 Park Ave. **Detroit 26, Mich.**

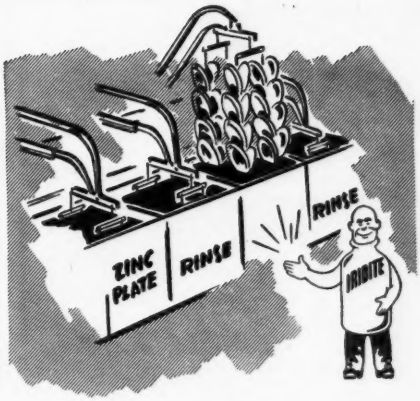
Established 1896

Now--a one dip

IRIDITE

bright finish for

AUTOMATIC ZINC PLATING



Common Chemical Addition Eliminates Caustic Rinse —Permits Amazing Low Cost

The one-dip Iridite Bright treatment for standard automatic zinc plating machines has been proved successful and is now being used in production runs.

Resists Corrosion—Protects from Stain

This amazingly low cost protective and brightening process produces a shining stain-free surface with good corrosion resistance . . . utilizing only the normal number of tanks after the zinc plating operation: rinse, Iridite, rinse.

Simple to Operate—No Bleaching Dip

This special one-dip Iridite Bright is a non-electrolytic chemical solution . . . operates at 80 to 85° F . . . with no specially trained personnel . . . equally adaptable to bulk plating of parts. Eliminates need for second or bleaching dip.

ALLIED RESEARCH PRODUCTS, INC.

4004-EAST MONUMENT STREET
BALTIMORE 5, MD.

Whatever your problem in finishing zinc or cadium —there's an Iridite to do the job. For details, write —wire—or 'phone.

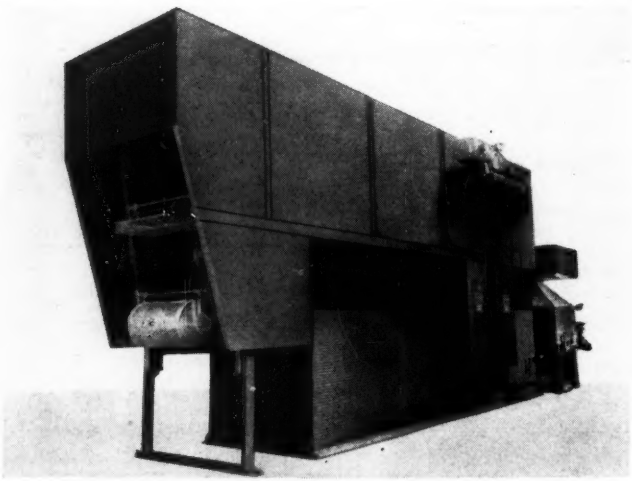
New • EQUIPMENT • MATERIALS • PROCESSES

Phillips Tumbling Conveyor

For the cleaning of small parts at a rate of approximately 2,000 to 4,000 lb. per hour, depending upon the type of part being cleaned, the Phillips Manufacturing Co., 3438 Touhy Ave., Chicago 45, Ill., is offering the fully automatic tumbling conveyor shown herewith. The equipment provides for loading and unloading of parts at the same end and is designed to carry either flat trays or tumbling baskets, or trays and baskets alternately. The tumbling baskets are for small parts that would cup solvent.

The machine is supplied complete with an automatic still and is wired so that dirty solvent is continually pumped into the still and the reclaimed solvent is continually returned to the machine. The conveyor system consists of two strands of roller chain connected at 2-foot intervals by cross rods. A means for rotating the tumblers within the degreaser is provided. The degreaser is electrically heated by immersion type heating elements. The still is heated by strip heaters and has a distillation rate of 60 to 75 gallons per hour.

Both the still and machine are fully automatic, having low limit controls which shut off the heat, and manual reset safety controls in the boiling chambers to shut off the heaters if the boiling temperature of the solvent rises to the danger point due to excessive contamination or low solvent level.



Phillips Tumbling Conveyor

Redesigned Semi-Portable Dust Collector

For dust control in industry, Hammond Machinery Builders, Inc., 1622 Douglas Ave., Kalamazoo 54, Mich., is offering a

Hammond Redesigned Semi-Portable "Duskolector"

functionally redesigned semi-portable "Duskolector" in three sizes as follows: No. 30 (¼ h.p. motor, 330 c.f.m. capacity), No. 40 (½ h.p. motor, 700 c.f.m. capacity), and No. 50 (1 h.p. motor, 1,000 c.f.m. capacity). The unit can be readily used with any of a number of different grinding machines and is designed for easy installation, occupying a minimum of floor space.

Dust-laden air is drawn from the grinder wheel hood through an air expansion chamber at the bottom of the cabinet where the heavier particles drop immediately into a pan due to decreased air velocity at this point and to a special air fin construction. The air is then drawn up through a set of three "fiberglas" filters which remove the finer particles. The filters are of the economical "throw away" type and can be readily cleaned by shaking. Since the air is drawn from the grinder and merely recirculated in the room, heat loss is said to be eliminated.

Designed to operate only when the grinder is being used, the Duskolector is specially suited for use in isolated toolrooms or departments where connection to an exhaust system is impractical.

Radiant Gas Tinning Pot Furnace

Multiple strands of wire can be tinned continuously in a pot heated by radiant ceramic gas burners in a furnace developed and manufactured by the Selas Corporation of America, Erie Ave. and D St., Philadelphia 34, Pa. Wire gauges from 4 to 20 are now being tinned at a production rate of 150 to 500 feet per minute.

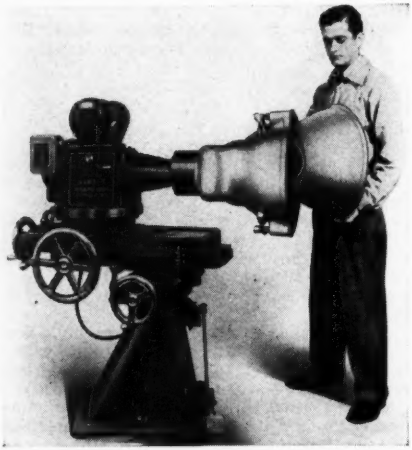
An air-gas mixing system, installed with the unit, regulates fuel supply for complete and effective combustion, the manufacturer states. The radiant burners are spaced to apply the greatest concentration of heat at the end where the wire enters the pot and to maintain the required temperature throughout. Increased pot life is attributed to the method of applying heat from the radiant burners in patterns along the sides of the pot. The pot itself is made of whatever steel is required for a specific installation.

According to the manufacturer, this type of pot furnace is applicable to hot coating processes such as rosin, lead, zinc, and plastics.

Selas Radiant Gas Tinning Pot Furnace. The pot has been raised to show the combustion chamber; (a) radiant ceramic gas burners; (b) access doors; (c) gas burner manifold.

Improved Buffing and Polishing Machine

An improved buffing and polishing machine designed to provide greater flexibility for polishing large areas is announced by the Vanott Machine Corp., 222 Colgate Ave., Buffalo 20, N. Y. The machine is available in three types (single, four, and eight-spindle units), with the head swiveled automatically by depressing a foot lever. Movements at right angles on the horizontal plane are accomplished by two handwheels. The range of vertical adjustment has been increased, and an automatic oscillating movement up to 6 inches is available.



Vanott Improved Buffing and Polishing Machine

Chucks for holding the parts to be polished are custom built to meet individual industrial specifications.

"Dust-Free Tester"

Henry Zuhr, Inc., 197 Lafayette St., New York 13, N. Y., manufacturer of organic finish testing equipment, announces the availability of a "Dust-Free Tester" for determining the drying time of paints, varnishes, and lacquers. The dimensions of the tester are designed to allow its use on films as narrow as 1½ inches and as wide as 3⅜ inches.

The tester has been designed and built to utilize standard Multifex as the "dust" medium. In testing for dust-free time, the tester is placed over a new part of the film at regular intervals, starting at the top and working downward. Deposits may be made regularly until the film is dry. The point at which the Multifex no longer sticks to the film is the dust-free time. The end point is said to be unmistakable on any material, even on white coatings.

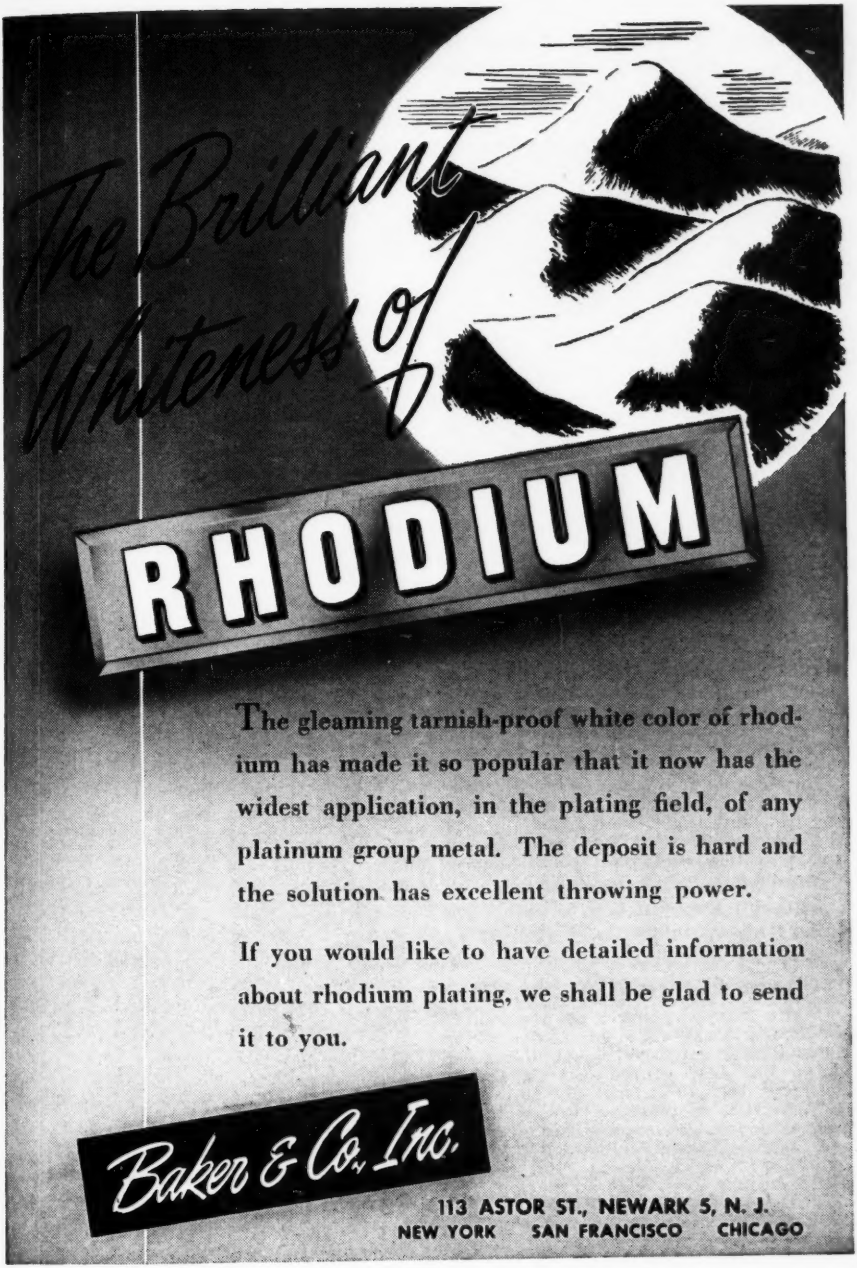
The Dust-Free Tester proper consists of a chromium box, mounted on a frame. When energized electrically, by pushing a button, the Multifex falls through a wire screen in a uniform deposit. The tester is designed to operate from a standard a.c. power supply of 110-115 volts.

Leeds "Flat-Flex" Conveyor

Known as the "Flat-Flex," a powered flat conveyor which can travel around almost any desired curve has been developed by The Leeds Electric & Manufacturing Co., Hartford, Connecticut.

Through the use of a newly patented conveyor chain, a balanced weave wire mesh belt is guided around practically any curve, and at the same time, wear on the edges of the wire mesh belt is eliminated because they do not drag against guides, the manufacturer states. Flat-Flex may be used in conjunction with other flat coveyors, or the entire conveyor, including straight and curved runs, may be continuous.

Leeds "Flat-Flex" Conveyor


The Brilliant Whiteness of
RHODIUM
The gleaming tarnish-proof white color of rhodium has made it so popular that it now has the widest application, in the plating field, of any platinum group metal. The deposit is hard and the solution has excellent throwing power.
If you would like to have detailed information about rhodium plating, we shall be glad to send it to you.
Baker & Co., Inc.
113 ASTOR ST., NEWARK 5, N. J.
NEW YORK SAN FRANCISCO CHICAGO

Edmont Industrial Glove

An industrial glove made of fabric and coated with vinylite resins, which is claimed to be 25 per cent more wear-resistant than the ordinary work glove, is now being manufactured by the Edmont Manufacturing Co., Coshocton, Ohio. Permitting complete freedom of hand action, the glove can be used to handle materials that are wet or dry, sharp or abrasive, and offers protection against acids, caustics, oils, greases, and many solvents.

Edmont Industrial Glove in use

The Edmont Industrial Glove is recommended for use in chemical manufacturing, iron and steel forming and processing, automobile and truck manufacturing, painting, and plating, and many other industries.

Oakite Composition No. 38

Oakite Composition No. 38, designed to produce a dense foam on acid pickling solutions and effectively seal in evolved gases, has been introduced by Oakite Products, Inc., 20 Thames St., New York 6, N. Y. It is extremely stable in highly acid solutions, the manufacturer reports, and forms a dense foam blanket on nitric-hydrofluoric, hydrochloric, and sulfuric acid solutions to provide an efficient seal against the escape of acid fumes.

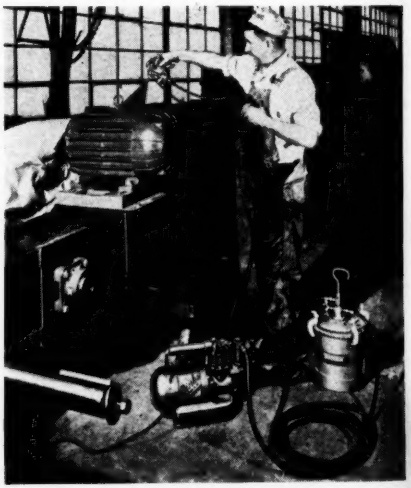
Oakite Composition No. 38 is said to minimize the fuming of such bright dips as nitric-hydrofluoric acid on cast aluminum, nitric-sulfuric on brass and copper alloys at room temperature, and nitric-sulfuric-zinc oxide at 180 deg. F. on copper alloys and brass. It is reported effectual for use in plants where acid fumes escaping into the air tend to rust exposed metal surfaces.

Binks DP Portable Paint Spray Unit

No larger than a small tool box and weighing only 47 pounds, the Binks DP Paint Spray Unit, developed by the Binks Manufacturing Co., 3118-40 Carroll Ave., Chicago 12, Ill., sprays any coating with the same efficiency as a 1 h.p. unit, it is claimed. It is especially adaptable to maintenance work where speed and quality are required, but where a large spray installation is not needed.

Because of its compactness, lightness, and portability, the DP adapts itself to a wide range of uses for spray painting in maintenance work, and will handle enamels, lacquers, shellacs, varnishes, and other coatings.

The DP portable paint spray delivers 40 pounds working pressure in ample volume to operate Binks standard spray guns. It can be plugged into any 110/120-volt a.c. line.

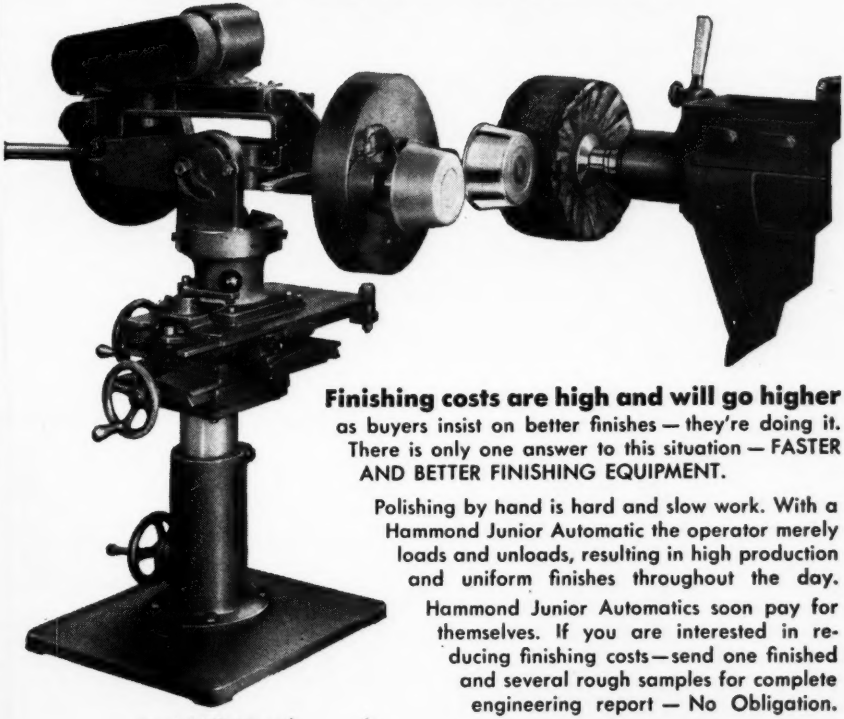


Binks DP Portable Paint Spray Unit in use

You Are Paying

FOR A... Hammond JUNIOR AUTOMATIC

WHY NOT USE IT!



Model SE2SF with Hammond Polishing Lathe

Finishing costs are high and will go higher as buyers insist on better finishes — they're doing it. There is only one answer to this situation — FASTER AND BETTER FINISHING EQUIPMENT.

Polishing by hand is hard and slow work. With a Hammond Junior Automatic the operator merely loads and unloads, resulting in high production and uniform finishes throughout the day.

Hammond Junior Automatics soon pay for themselves. If you are interested in reducing finishing costs—send one finished and several rough samples for complete engineering report — No Obligation.

Hammond Machinery Builders INC

1622 DOUGLAS AVENUE • KALAMAZOO 54, MICHIGAN

"Plyglov"

A coated cotton work glove which is stated by the manufacturer to outwear ten pair of cotton or four pair of synthetic rubber gloves on comparable jobs is being marketed by The Milburn Co., 3246 E. Woodbridge St., Detroit 7. Mich. Known as "Plyglov," it will not crack or peel; does not become slippery when immersed in oil, water, or solvents; and is water, acid, caustic, and petroleum solvents proof.

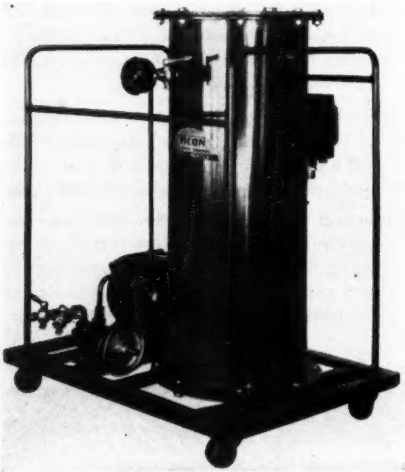
Plyglov is available in four different styles to meet various conditions.

"Vicon" Paint Heater

Development of an improved viscosity control paint heating and recirculating system, known as "Vicon," has been announced by the Industrial Sales Company of California, 455 S. Fair Oaks Ave., Pasadena 1, Calif. According to the manufacturer, the unit maintains uniform viscosity of all types of paint materials by constant temperature control and is designed for use with paint spraying systems, to be installed between the pressure material tank or gravity feed system and the spray gun.

The hermetically sealed and evacuated heat exchanger is capable of heating paint to any predetermined temperature between 100 and 200 deg F., with a maximum temperature rise of 100 deg. F. at any rate of flow up to the rated capacity of the equipment. This specially designed heat transfer system assures continuous uniform heating of the paint, thereby providing uniform viscosity at all times.

The Vicon Paint Heater is a portable unit mounted on a caster base ready for connection to the pressure tank, spray gun, and power outlet. A maximum of 15 minutes is required for preheating. The motor is explosion-proof, and all wiring, switches, and controls are vapor-proof.



"Vicon" Paint Heater

Bauer Magnetic Separator installed over an electrocleaner

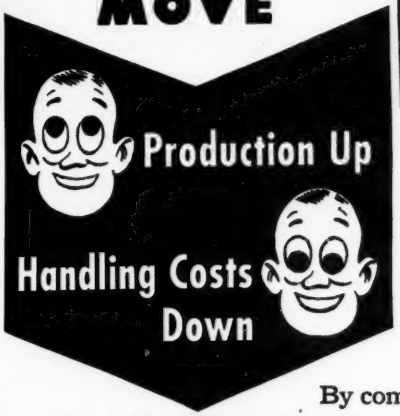
Magnetic Separator for Chemical Solutions

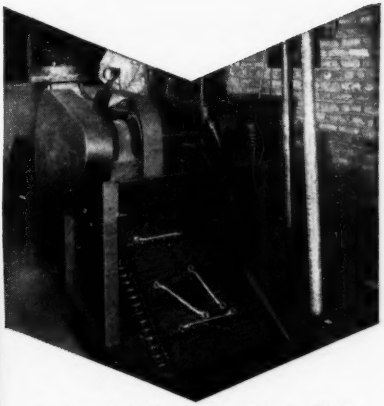
The Bauer Chute-Type Magnetic Separator, manufactured by The Bauer Bros. Co., 1762 Sheridan Ave., Springfield, Ohio, is available coated with a special waterproofing treatment so that it can be incorporated into a circulating system for handling and treating chemical solutions of various kinds.

By inserting the magnet in a sloping tray emptying into a funnel, draining into the cleaning tank of an electroplating installation, iron particles are removed from the cleaning solution as it is circulated by means of a pump over the sloping tray. This treatment is said to improve the efficiency of the cleaning solution, eliminating the possibility that iron particles may adhere to the parts being cleaned and be carried over into the subsequent plating solution.

The manufacturer states that these magnets are available also for demetalizing oil, coolants, and other fluids.

Cambridge
WOVEN WIRE BELTS MOVE





A Cambridge Drive Chain Belt hustles wrenches through this quenching operation. Special metals are used in high temperature belts for brazing, annealing, sintering, soldering, etc.

By combining movement with processing, Cambridge Woven Wire Conveyor Belts offer these solutions to your materials handling problems.

Fast continuous production—improved, more uniform products—work area savings—reduced accidents from manual handling—PLUS reduced handling expense by freeing costly manual labor for other jobs.

Cambridge belts can be fabricated from any metal or alloy—to the mesh or weave that suits your requirements best.

FREE BOOK! "Woven Wire Conveyor Belts for Industrial Applications." 56 pages, illustrated. Describes Cambridge belt construction and use. Write today for your free copy . . . or call the Cambridge office nearest you.

Cambridge Wire Cloth Co.

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NEW YORK • BALTIMORE • PITTSBURGH • SAN FRANCISCO
BOSTON • DETROIT • CHICAGO • ST. LOUIS • HOUSTON

Unbreakable Acid Container

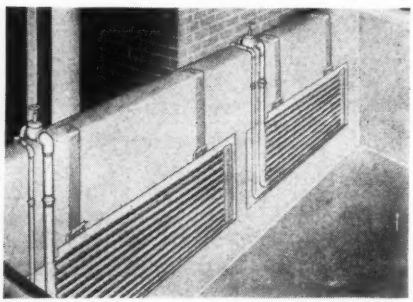
Designed for safe pouring of acids where a reaction is expected, an unbreakable safety container is now being marketed by the Automotive Rubber Co., Inc., 8601 Epworth Blvd., Detroit 4, Michigan.

Arco Unbreakable Acid Container

Equipped with a long 14-inch spout with curved neck that rests securely on the edge of the tank, the Arco Unbreakable Acid Container is constructed of perforated steel with all seams welded, and is completely covered inside and out, including handles, with ⅛-inch tough, seamless, semi-hard rubber. The inner and outer coatings are wedded through the perforations in the metal to assure permanent adhesion.

Udylite Platecoils

A new type heating and cooling coil made from cold rolled steel, stainless steel, or Monel, designed for use in plating, degreasing, pickling, and anodizing tanks, is being marketed by The Udylite Corp., Detroit 11, Michigan.



Udylite Platecoils installed in tank

According to the manufacturer, the patented design of embossed metal plates permanently welded together possesses the following advantages: high b.t.u. capacity per square foot of area, rapid even heat transfer, small coil space, easy installation, and low maintenance cost. Either heating or cooling can be done with the coils, which fit practically every size and design of tank.

Johnson S-9 Sand-Air

The Johnson Engineering & Sales Co., 1137H Broadway, Rockford, Ill., has announced its S-9 Sand-Air, a lightweight, portable sanding machine reciprocating type built for heavy duty service in white sanding, sealer sanding, and final finishing. It is also used for rubbing, polishing, or finishing metal or plastic surfaces and organic finishes.

Johnson S-9 Sand-Air

Features of the S-9 include a net weight of only 9 lb.; opposed straight-line reciprocation of double pads; instantaneous "natural grip" actuation; a newly designed recessed palm lever, flush with the contour of the unit; and a built-in water flushing attachment for wet sanding.

Flexmount Pyrometer

The Flexmont Pyrometer, developed by the Pyramid Instrument Co., 117 Lafay-

719 PAINT FINISHERS ..... *Can't Be Wrong!*

THAT'S THE NUMBER OF PLANTS THAT USED *Materials* FROM INDUSTRIAL CHEMICAL PRODUCTS COMPANY LAST YEAR . . . *To Clean and Prepare Metals for Painting!*

TRY SOL-KLEAN

Removes Oil and Rust . . . And Anchors Paint To Metal . . . .

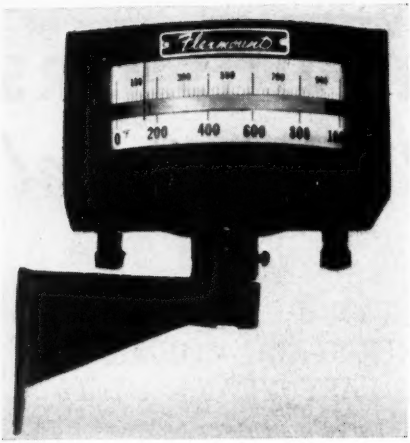
Over 3,000,000 gallons used in the last 10 years . . . Etches metal and coats with phosphate . . . Non-inflammable . . . Economical (dilute one volume of SOL-KLEAN with 3 volumes of water) . . . Apply by brush or dipping—wiped or washed off!

INDUSTRIAL CHEMICAL PRODUCTS COMPANY

3778 BELLEVUE AVENUE **DETROIT 7, MICH.**

Representatives In Principal Mid-Western Cities

In Canada made and sold by Boyle Chemicals Ltd., Windsor, Ont.



Flexmount Pyrometer

ette St., New York 13, N. Y., features a swivel mount, affording complete flexibility in its adaptation to all installation problems. By a simple adjustment of one set screw, the meter case can be moved in a horizontal arc from 0 to 180 degrees. This feature provides easy reading from any direction.

Flex arms of all sizes and shapes are available to facilitate mounting in ordinarily inaccessible locations. The pyrometer can also be furnished in flush or surface mounting, without the flexmount.

Said to be ruggedly designed to withstand the rigors and abuse of normal industrial use, the pyrometer is completely housed in a metal case, 5¼ inches wide x 3⅞ inches deep x 2¾ inches high, black enameled with wrinkle finish. Although compact, it has a mirrored scale 3¾ inches long, with large bold numerals, designed for easy reading. Accessories, including thermocouples and protective tubes for all applications, as well as lead wire and connectors, are available for use with the meter.

Northwest Cleaning Compound

A cleaning bath that is effective on aluminum parts which are heavily coated with polishing composition, especially in recessed areas, for use prior to painting, anodizing, or plating, is announced by the Northwest Chemical Co., 9310 Roselawn Ave., Detroit 4, Michigan.

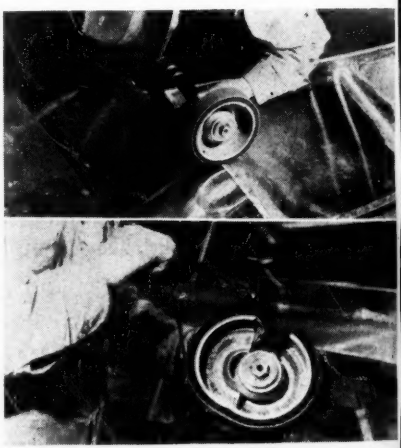
Complete removal of soil without scrubbing is said to be accomplished by processing the work through a bath composed of from 2 to 4 ounces per gallon of Alkalume No. 1 plus 2 per cent by volume of Liquid Stripper No. 2 for a period of 2 to 5 minutes to 160 to 190 deg. F., the temperature depending upon the transfer time. This is followed by a thorough rinse, either of the free flowing or spray type.

The Northwest Cleaning Compound can be used in manual or automatic equipment where cleaning is done by immersion.

Drum Sander

To permit the use of abrasives in strip form on polishing, buffing, and grinding metal products, the American Diamond Saw Co., 519 N.W. Park Ave., Portland 9, Ore., has developed the "Cone-Loc" Drum Sander, a split drum cushioned with rubber, the halves of the drum being locked into a solid drum by a cone-type washer. Its light weight is said to make the unit highly adaptable for use with a flexible shaft, as well as on a stationary arbor.

Standard width abrasives, available in roll form, are wrapped around the drum and fastened into place by pins that recede out of the way when the cone washer is tightened. During buffing, polishing, or grinding operations, the wheel, it is claimed, never loses diameter and never



"Cone-Loc" Drum Sander

FLOCK

SHORT-CUT fibres of all types used to produce effects of suede, felt, velvet, mohair, velour, carpet on any surface in an economical manner.

LET our 25 years experience be your guide to quality results at lowest possible cost.

Rayon Processing Co. of R. I., Inc.

PIONEER PRODUCERS OF SURFACE COATING FLOCKS

65 MOSHASSUCK STREET • PAWTUCKET, R. I.

POLLAK PAINT CO.
715 Main St.
Buffalo, N. Y.

LAMBERT-NEW ENGLAND CO.
79 Sudbury St.
Boston, Mass.

H. R. MEININGER CO.
409 16th St.
Denver, Colo.

J. GORDON SMITH CO.
3901 Main St.
Dallas, Texas

requires dressing. Abrasive cloth in various grits can be quickly interchanged on the drum to accommodate rough or fine work.

The Cone-Loc Drum Sander is available rubber cushioned in sizes from 6¼ to 12 inches in diameter and in various standard widths and bores. A 6¼-inch felt cushioned sander is also available.

Liqui-jector

Water and water-oil emulsions are removed automatically and continuously from compressed air or gas lines by the Liqui-jector, product of Selas Corporation of America, Erie Ave. and D St., Philadelphia 34, Pa. The equipment is utilized in precision pneumatic operations that require positive conditioning of air or gas. Typical applications are in liquid separation, agitation, drying, spraying, instruments, and pneumatic mechanisms.

Phase separation and liquid ejection are accomplished by two ceramic tubes, one water-repellent and the other water-permeable but air-impervious. Compressed air or other gas passes through the first tube where it is stripped of its aqueous contamination and dirt. Moisture drops to the bottom and drains through the second tube without loss of air. The water ejection rates for the three sizes of the equipment vary from 0.5 to 2.5 gallons per 24 hours.

Sharpe No. 11 Flock Gun

A flock gun designed to spray all types of flock and practically all forms of powdered or granulated materials, designated as the No. 11, has been marketed by the Sharpe Manufacturing Co., 1224 Wall St., Los Angeles 15, Calif. The gun may be adjusted by the operator for conical or fan type spray by means of a convenient valve.

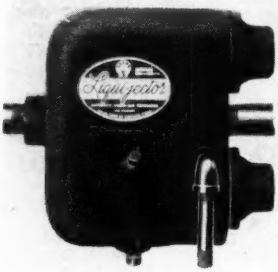
Sharpe No. 11 Flock Gun

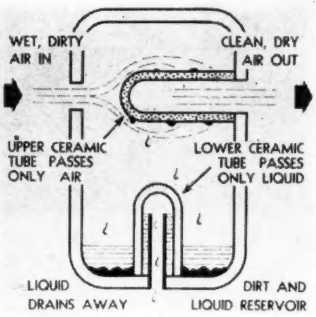
Two sizes of aluminum cups are available with the Sharpe No. 11 Flock Gun—a two-quart or a one-gallon size. These cups are held in place by "C" clamps on the sides of the frame which are easily secured to the bayonets on the cup.

Buhl Pocket Microscope

A pocket microscope for use in the inspection of precision parts, tools, gauges, castings, finishes, threads, molding materials, bearings, sands, abrasives, drills, reamers, and so on, is being marketed by the Buhl Optical Co., 1009 Beech Ave., Pittsburgh 12, Pennsylvania.

Five inches long and ¾ inch in diameter, the Buhl Pocket Microscope has corrected achromatic lenses, a self-contained reflector, and a vernier focusing ring. To use, it is set to the desired magnification (40, 50, or 60X) by adjusting the draw tube (pulling out at the black eyepiece), and the angular end placed

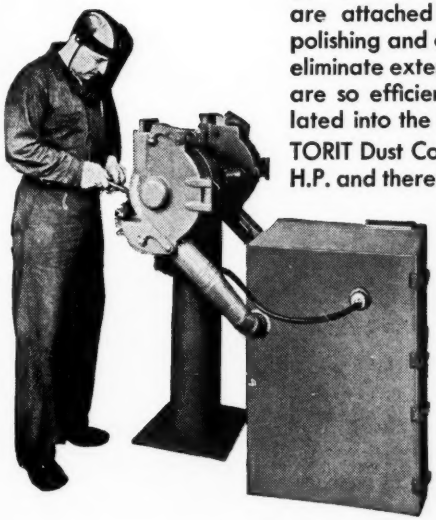



WET, DIRTY AIR IN
CLEAN, DRY AIR OUT
UPPER CERAMIC TUBE PASSES ONLY AIR
LOWER CERAMIC TUBE PASSES ONLY LIQUID
LIQUID DRAINS AWAY
DIRT AND LIQUID RESERVOIR

Liqui-jector (left), cross-section of Liqui-jector

The dust in your plant also slows production. Solve this problem with

TORIT DUST COLLECTORS



Self-contained and portable, Torit Dust Collectors are attached to, and operate with grinding, polishing and other dust-creating machines. They eliminate extensive piping, idle running time, and are so efficient that the cleaned air is recirculated into the room.

TORIT Dust Collectors range in size from ⅓ to 3 H.P. and there are types for every purpose. They are now being produced in quantity so that immediate delivery can be made on all standard models. For complete information and the latest TORIT catalog write:

TORIT

MANUFACTURING CO.

314 WALNUT ST. • ST. PAUL 2, MINN.

Buhl Pocket Microscope

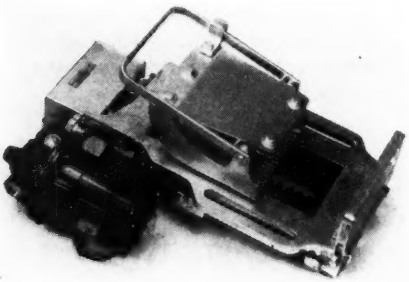
with the reflecting surface towards the light. The microscope should rest firmly on the table in an upright position; it must not be slanted. Fine focus is obtained by holding the instrument with the left hand, placing the eye close to the eyepiece, and slowing turning the vernier at the knurl with the right hand.

Nankervis Improved Buffing Compound Applicator

Improvement of its buffing compound applicator has been announced by the Geo. L. Nankervis Co., 5442 Second Blvd., Detroit 2, Mich. All moving parts are now enclosed by means of Neoprene boots on the feed screw and slides, and all gears and adjustments are in a metal box, thus eliminating the possibility of clogging the mechanism with buffing compound, lint, and so on.

The Nankervis Applicator, weighing only 22 lb., can be installed at any angle on any automatic polishing machine. It has an intermittent feed operating at the rate of 14 strokes per minute which can be adjusted to provide the correct amount of buffing compound on each application. A 110-volt single-phase or 220/440-volt 3-phase 60-cycle drive motor is available.

The improved applicator has a redesigned, quick-action clamp, and the standard carrier will accommodate any compound up to 4 inches wide x 2 inches thick x 24 inches long. A special carrier to accommodate cakes up to 6 inches in width and an adapter for round cakes are available on special order.



Nankervis Improved Buffing Compound Applicator

Wahlert Safety Carboy Drainer

Manufactured by the Wahlert Safety Products Corp., 25 Lafayette St., Brooklyn 1, N. Y., the Safety Carboy Drainer, used in conjunction with the company's Carboy Tilter, pours but does not spill or splash. Uninterrupted liquid flow is guaranteed through the use of an air vent which makes pumping or syphoning unnecessary.

Wahlert Safety Carboy Drainer

Every part of the drainer is replaceable, the manufacturer states. The soft rubber neck fits different sized carboys, and the vent and spout are made of hard, durable, acid-proof rubber. There are three sizes available: Junior for 5-gallon carboys; Standard for 10 to 13-gallon carboys; and Large for 13-gallon carboys.

Arco "Optonic Color Compass"

The Arco Co., 7301 Bessemer Ave., Cleveland 4, Ohio, or 745 E. 59th St., Los Angeles, Calif., is offering free its color guide and selector to plant superintendents, mill managers, maintenance engineers, purchasing directors, or other industrial executives interested in scientific color selection and its many constructive benefits.

Known as the "Optonic Color Compass," the device is a color selector wheel which shows eight different color schemes for securing the full advantages

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Consult with the K-P district sales office or write direct. Korb-Pettit Wire Fabrics and Iron Works Inc., 1509 North Mascher Street, Philadelphia 22, Pa.

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Korb-Pettit Spiral Woven Wire Conveyor Belts

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Arco "Optonic Color Compass"

inherent with the proper choice and use of 28 "eye-ease" colors for interior painting. Simply by setting the arrow on the inner circle of the compass to point to the exposure of a room (north, south, etc.) as indicated on the outer circle, the correct Optonic colors for walls, dado, sash, trim, and accessory areas are shown. Alternate recommendations for two-color effects are also given.

Hewitt Rubberlokt Rotary Wire Wheel Brush

A rotary wire wheel brush with bristles embedded or locked in rubber centers has been introduced by the Hewitt Rubber Div., Hewitt-Robins Inc., Buffalo 5, New York.

The manufacturer claims that the combination of steel bristles mounted in rubber results in maximum safety of operation, improved performance, and long life. These advantages are secured, the manufacturer states, because the wire bristles can flex over a gradual arc of their entire length and, further, by reason of the flexibility of the rubber core, the bristles return to their original position after each brushing surface contact. The flexible wires are said to continuously maintain the maximum number of cutting points in contact with the work, while at the same time they will readily conform to uneven surfaces.

Increased uniformity of finish is claimed because the operator can apply less actual pressure to maintain wheel-work contact and can give more attention to uniformity of finish. Decreased vibration and decreased operator fatigue are said to be characteristics of the Hewitt Rubberlokt Brush.

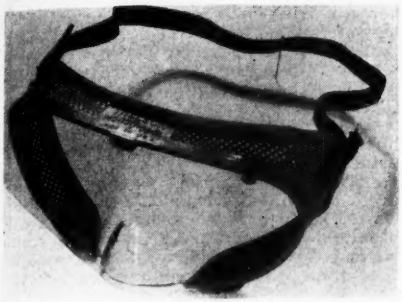
Six, eight, and ten-inch industrial sizes of Rubberlokt Brushes are currently being produced and other sizes will be added. The brush can be used on either bench or portable tools for all finishing operations in which wire brushes can be used advantageously.

Cole Model 8A6 Switchboard Instruments

Developed by the Cole Instrument Co., 1320 S. Grand Ave., Los Angeles 15, Calif., the Model 8A6 group of switchboard instruments is now available. The instruments in this group, consisting of voltmeters, millivolt meters, ammeters, milliammeters, and microammeters, are supplied in square cast aluminum cases with a dull black finish and are said to record voltage and current within an accuracy of 1 per cent. The manufacturer points out that high torque-to-weight ratios are maintained throughout the series. Direct current instruments are of the permanent-magnet moving-coil type while alternating current instruments are of the moving-iron type.

Standard instruments are furnished with white scales and black divisions and figures, but instruments with black

Cole Model 8A6 Switchboard Instrument



Willson MonoGoggle

scales and white divisions and figures can be supplied. Likewise, multiple range instruments and compressed scale instruments can be supplied to order.

Willson MonoGoggle

For eye protection in woodworking, grinding, spot welding, and similar light duty operations, Willson Products, Inc., Reading, Pa., has added a newly styled MonoGoggle to its line of personal protective equipment for industrial use.

Made of a one-piece plastic lens, the MonoGoggle offers wide, clear vision and ample eye protection. According to the manufacturer, features which contribute to comfort when worn on all-day jobs are its extremely light weight, excellent impact resistance, and low heat transmission of the lens, which greatly retards fogging.

Now both flat and curved lenses are available, so that those who wear prescription glasses may select the style most comfortable for them. Lenses come in either clear or green acetate, and are replaceable. MonoGoggle frames for all types are available in clear acetate, and in the increasingly popular mottle brown Polythene, which retains its flexibility under extremes of temperature.

Mystik Self-Stik Tape No. 5810

Mystik Adhesive Products, 2635 N. Kildare Ave., Chicago 39, Ill., has added Mystik Self-Stick Tape No. 5810, a low count cloth with a pressure sensitive adhesive, to its lines of industrial tapes.

Tape No. 5810 is adaptable for holding and sealing operations and as a protective material, and is used in packaging and shipping, and for production operations in manufacturing. According to the manufacturer, the tape has been found particularly practical for sealing and holding doors, drawers, and other loose parts in shipping stoves, refrigerators, and many other products.

Belke Utility Racks

Known as the Belke Utility Racks, five rack models that are said to efficiently handle 90 per cent of all plating jobs, including bright nickel and chrome, have been developed by the Belke Manufacturing Co., 947 N. Cicero Ave., Chicago 51, Ill. The racks, available in 30 and 36-inch lengths, are coated with Belke Universal Plastic to withstand all cleaning and plating cycles and are equipped with spring pressure tops to provide the positive electrical contact required for copper-nickel-chrome cycles.

A new Vac-Seal removable tip assembly, used on all models, has a flexible cup-shaped collar of Universal Plastic

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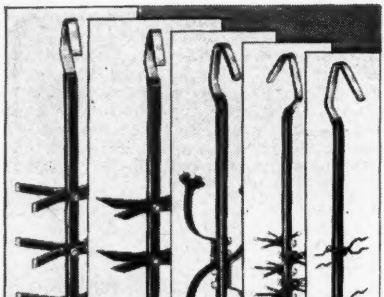

Belke Utility Racks

that joins the Universal Plastic Coating on the rack spine with a seep-proof seal. Interchanging of tip styles is easy, and broken tips are quickly replaced to maintain the racks at 100 per cent capacity, it is claimed.

Racks can also be furnished unassembled. Contact tips may be located anywhere on the spine by drilling a ¼-inch hole; no tapping is necessary.

Phenoplast

Distributed by L. Sonneborn Sons, Inc., Building Products Div., 88 Lexington Ave., New York 11, N. Y., Phenoplast is a liquid finish which not only coats the surface of products but becomes practically an integral part of the material to which it is applied. Tough, rugged, and transparent, it is recommended for use on metals, steel, wood, and so on, and can be brushed, sprayed, or dipped.

According to the manufacturer, Phenoplast dries in a few hours to a transparent film of light amber hue. Its high resistance makes it possible to withstand temperatures from below zero up to and over the boiling point, and it is unaffected by practically every acid and chemical solvent, as well as water, gasoline, oils, alkalies, salt spray, and strong brines.

Applied like varnish, Phenoplast renders the object nearly damage-proof. Used like glue, it becomes almost an unbreakable "joiner" so that metal stays welded through wind, weather, temperature changes, and wear and tear.

PRODUCT LITERATURE

The publications listed in this section may be obtained free upon written request on company letterhead to the manufacturers concerned. Your courtesy in mentioning PRODUCTS FINISHING when requesting copies of these publications will be sincerely appreciated by the manufacturer and the publisher of this magazine.

Udylite Platecoil. Adaptable to any tank for heating or cooling purposes, the Udylite Platecoil is fully described and illustrated in a four-page mailing piece available from The Udylite Corp., Detroit 11, Michigan.

"Atlas Industrial Floors" is the title of an 8-page bulletin obtainable from the Atlas Mineral Products Company of Pa., Mertztown, Pa., which describes and illustrates five types of acid-proof and/or alkali-proof brick or tile cement.

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Write for illustrated literature.

HENRY ZUHR, INC.
187 Lafayette St., N.Y.C., 13

Clear Metal Finishes. Features, advantages, applications, and uses of Zapon Clear Metal Finishes are discussed in an eight-page pocket-size folder released by the Atlas Powder Co., Industrial Finishes Div., Stamford, Connecticut.

"Perflow Nickel Process" is the title of a booklet issued by The Harshaw Chemical Co., 1945 E. 97th St., Cleveland 6, Ohio. The booklet outlines operating instructions and equipment requirements for users of the Harshaw Perflow Plating Process, and includes outlines of analytical methods used in connection with solution control.

Detrex 79 Folder. Detrex 79, a phosphate coating compound for removing light soils and oil films, inhibiting corrosion of steel and cast iron prior to painting, and producing a clean matte finish for superior adhesion of paints, is discussed in a folder prepared by the Detrex Corp., P. O. Box 501, Detroit 32, Michigan.

Koven "Men, Facilities and 'Know-How'" is the title of Brochure No. 490 prepared by L. O. Koven & Brother, Inc., 154 Ogden Ave., Jersey City 7, N. J., metal fabricator of standard and special equipment and apparatus for processing, material handling, and storage for all industries. Printed in two colors, the 24-page brochure illustrates by photographs and sketches the story of Koven's experience, knowledge, and facilities in the field of metal fabrication.

"Why and How to Use H-VW-M Fluxes for Hot Dip Galvanizing and Hot Tinning" is the title of Bulletin F-100, prepared by the Hanson-Van Winkle-Munning Co., Matawan, N. J., which presents the technical details for the use of its No. 20 Fluxes for hot dip galvanizing and Fas-Tin Flux for hot tinning. The bulletin reviews the techniques involved and describes the pre-galvanizing cycle, giving a work flow sheet, operation by operation, for hot galvanizing from the first alkali cleaner, through pickling, rinsing, fluxing, and galvanizing. Also included are a description of the pre-tinning cycle and the use of Fas-Tin fluxes as a wash or a flux blanket.

Duriron Bulletin. Duriron and Durichlor (high sicilon iron alloys for corrosive services). The data collected on Duriron and Durichlor in the last 15 years has been collated and published as Bulletin 113, which is available from The Duriron Co., Inc., Dayton 1, Ohio.

Precious Metal Plating, a 20-page revised booklet issued by A. Robinson & Son, 131 Canal St., New York 2, N. Y., presents in usable form accepted methods applied in the electroplating of such articles as watch cases, insigna, jewelry, novelties, pen and pencil parts with rhodium or gold.

Paint Heater Bulletin. Uniform viscosity by positive temperature control with the use of the "Vicon" Paint Heater is described and illustrated in a four-page folder available from the Industrial Sales Company of California, 455 S. Fair Oaks Ave., Pasadena 1, Calif. Data regarding operation, advantages, and specifications are presented.

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Boothcote Div., 19 Stetson St., Buffalo 6, N. Y.

Sheet Metal Fabrication. A folder picturing the company's two plants and illustrating and describing its facilities for fabricating sheet metal is obtainable from the Young & Bertke Co., 2235 Buck St., Cincinnati 14, Ohio.

Abrasive Belt Bulletin. Examples of Behr-Manning pioneering and present-day engineering service and methods in the field of contour grinding are set forth in the May-June issue of Behr-Manning Bulletin, available from Behr-Manning, Troy, New York.

Polishing and Buffing Lathe Bulletin. Motor-Driven Polishing and Buffing Lathes are the subject of Bulletin L-203 prepared by the Hanson-Van Winkle-Munning Co., Matawan, N. J. Described and illustrated are nine lathes for various polishing and buffing applications.

Glove Catalog. Natural rubber, plastic, and "Neox" coated work gloves for industrial, household, and garden use are pictured and described in a 12-page pocket-size catalog issued by the Edmont Manufacturing Co., Conshocton, Ohio. The catalog contains a handy comparative wear qualities chart to aid in selecting the type of glove best suited to the user's specific work conditions.

Porcelain Enamels for Aluminum. New Products Bulletin No. 31, describing in detail the materials and methods employed in the application of Du Pont porcelain enamels to aluminum alloys, is available from E. I. du Pont de Nemours & Co., Electrochemicals Dept., Wilmington 98, Delaware.

Perma-Skin Vinyl Corrosion Resistant Protective Coatings are the topic of a four-page folder prepared by the Dennis Chemical Co., 2701 Papin St., St. Louis 3, Mo. Applicable to a wide range of industries, the finishes provide toughness, gloss, adhesion, and chemical resistance for metal, concrete, stone, wood, and brick.

Cambridge Revised Wire Cloth Catalog. The Cambridge Wire Cloth Co., Cambridge, Md., is now offering a revised edition of its woven wire cloth catalog which is complete with specifications, descriptions, and illustrations of meshes, metals, and alloys included in its line. Included in the 85-page catalog are: reference information for those concerned with filtering and bulk handling of materials during processing and manufacturing; metallurgical data on nearly every major metal and alloy; and photographs of Cambridge's facilities and typical examples and applications of its products.

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Binks Bulletin 601. Complete illustrated information on the Binks DP ½-Horsepower Portable Spray Unit, either electrically powered or gasoline engine driven, may be obtained from the Binks Manufacturing Co., 3118-40 Carroll Ave., Chicago 12, Illinois.

Rockwell Data Sheet RF-2, describing and illustrating the Rockwell Continuous Automatic Pickling Installation which performs nine operations in tandem process, has been released by the W. S. Rockwell Co., 200 Eliot St., Fairfield, Connecticut.

Acid Hose. Catalog Section 3440, illustrating and describing its acid hose for discharge, suction, and pinch-valve service, has been issued by The B. F. Goodrich Co., Akron, Ohio. Featured is a table which lists recommended concentrations, temperatures, and pressures of the various acids to give longest service life to the hose. Advantages of the hose for various services are outlined and specifications listed.

To mark completion of its modern factory for the development and manufacture of coated abrasive products, The Carborundum Co., P. O. Box 337, Niagara Falls, N. Y., has published a 32-page two-color book presenting the outstanding features of its new service, research, and production facilities at Wheatfield, New York. Entitled **"The Finest in Coated Products . . . Carborundum,"** the book is illustrated with dry brush drawings and describes the closely controlled scientific methods employed at Wheatfield.

"Wheelco Comments." Volume 8, No. 3 of the external house organ of the Wheelco Instruments Co., 847 W. Harrison St., Chicago 7, Ill., describes four widely different types of temperature control applications. Described in this issue are control instruments for the smallest continuous furnace at the Ferro Enamel Corporation, the new turbine blade fatigue tester built by Baldwin Locomotive Company, the high capacity injection molding machine manufactured by the Watson-Stillman Company, and the firing operation at the Metlox Manufacturing Company pottery.

Ashworth Metal Conveyor Belts. A 32-page catalog containing many illustrations and working data for the design, application, and selection of metal conveyor belts is available from Ashworth Bros., Inc., Metal Products Div., 306 Shrewsbury St., Worcester 4, Massachusetts.

Hammond Bulletin No. 10. A new line of 10 Junior Automatic machines to be used in conjunction with Hammond polishing and buffing lathes or any similar type are described and illustrated in a folder prepared by the Hammond Machinery Builders, Inc., 1622 Douglas Ave., Kalamazoo, Michigan.

"Making Money with New Wrinkles in Finishing" is the title of an eight-page technical folder, available from New Wrinkle, Inc., 1819 Bankers Bldg., Chicago 3, Ill., which presents valuable data on where and how to use Wrinkle Finishes, their range of colors and textures, and the new application technique for finishing rough castings.

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